NEW BAKER "Yardloader"
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4000 LB. GAS FORK TRUCK COSTS ONLY $2985.00

Priced about 25% under any other gas trucks in its capacity, the Yardloader now brings cost-saving fork truck operation within the reach of practically every company with yard-handling problems. Travel speed approaching 14 miles per hour, large pneumatic tires, exceptionally high ground clearance and oscillating trail axle make it the ideal truck for outdoor service over large unimproved or semi-improved areas.

Heavy-duty industrial engine of proven make, 4-speed transmission and extra-heavy drive axle assure ample power for top performance under any conditions. Hydraulic lift to 122 inches, automotive-type steer, convenient controls and excellent driver visibility are a few of the features contributing to safety and ease of operation.

Get all the facts—and save up to $1000.00 on your next gas fork truck.

Send in this coupon today.

THE BAKER-RAULANG COMPANY

1251 West 80th Street • Cleveland 2, Ohio

The Baker-Lull Corporation • Subsidiary, Minneapolis, Minn.
Materials Handling and Construction Equipment

TO THE BAKER-RAULANG CO., 1251 West 80th St., Cleveland 2, Ohio

Please send me information and specifications on the new Baker EY-40 Yardloader which sells for only $2985.00.

Name_____ Title_____

Company_____

Address_____

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'ROUND ABOUT with the editors in field and office

Edited by R. L. Marinello

PE Editor Visits Welding Show

ONE OF PLANT ENGINEERING'S editors, E. B. Skubik, recently attended the second annual welding show held in Buffalo, New York, in conjunction with the

E. B. Skubik, Plant Engineering; H. F. Henriques, Airco vice president; and D. Spoor, manager, Equipment Sales Department, at Air Reduction's exhibit

American Welding Society Conference. For those readers who were unable to attend this show, here is a brief account of several displays he found of interest.

Shortly after the official opening of the exhibit area, Air Reduction Co., Inc., put on several interesting demonstrations at its booth, using some of the firm's products. Included in these was an electric eye tracer which follows master patterns as well as drawings and translates motion to cutting torch.

Another outstanding development exhibited was the welding of flanges on a television tube face and cone section to form a unit. This was done in a special jig belonging to a glass-making firm.

Circulates Contents Page

PLANT ENGINEERING:

"It is a normal practice for an industrial library to route each magazine to those who have requested the service. This is a slow and unsatisfactory process. The last man on the list may not receive the magazine until several months after publication, and several of those on the routing list may find nothing in that particular issue of interest to them.

"We propose, therefore, to reproduce your contents page in quantity and simultaneously distribute a copy to each person on our routing list. The complete issue, then, will be sent to those who, finding an item of interest listed on the contents page, notify us of their interest.

"Because we believe our readers of your magazine will be better satisfied with this system, we request that we be permitted to make the necessary number of copies of the contents page of each issue as we receive it." *G. E. Randall, Manager, Technical Information Branch, Aro, Inc., Tullahoma, Tennessee.*

▶ You certainly have our permission to reprint the contents page. This sounds like a very excellent means of distributing information to all interested readers at one time. It is possible that this idea may be followed by other plants who experience the same difficulties you mention.—*Editors.*

Data on Industrial Heating

THREE HALF DAYS of practical industrial heating sessions will be conducted at the National Metals Congress and Exposition in Chicago, November 2 and 3, by the Industrial Furnace Manufacturers Association.

On November 2, there will be morning and afternoon sessions on atmospheres with speakers from member companies of the Association covering both theory and furnace applications, including case examples. On November 3, there will be an afternoon session on induction and dielectric heating.

Further information about the industrial heating sessions may be obtained by writing to Mr. C. H. Stevenson, Vice President, Lindberg Engineering Co., 2456 W. Hubbard St., Chicago 12, Illinois, who is the program chairman.

Plant Construction News

NEW HOME of **C. I. Hayes, Inc.,** manufacturer of electric heat treating furnaces, is nearing completion in Cranston, Rhode Island . . . **Du Pont** will expand its facilities for manufacturing Teflon with an addition planned at its Washington Works near Parkersburg, West Virginia. The company is also constructing a new plant in Louisville, Kentucky, for the manufacture of "Freon-22" . . . Nearing completion is the new plant of **The Foxboro Co.** at Pittsburgh, Pa., which will double the present instrument assembly, service and repair facilities of the company . . . **Westinghouse Electric Corp.** is expanding its Small Motor Division operation by constructing a new plant at Upper Sandusky, Ohio. Westinghouse is also erecting a new air conditioning plant at Staunton, Virginia, to increase the company's pro-

Plant Engineering is published monthly at Chicago, Ill. Subscriptions one year $10 in the U. S. A. Canada $11; Elsewhere $12. Acceptance under Section 34.64, P. L. & R. authorized by Post Office.

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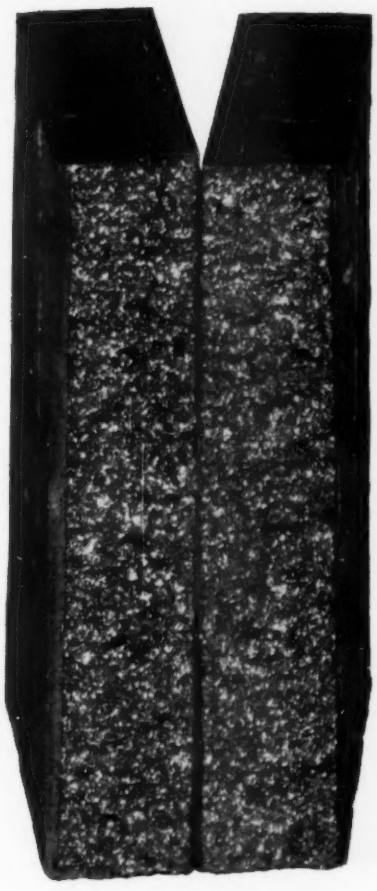
WROUGHT IRON



STEEL

These are actual photographs of fractured pieces of wrought iron and steel. The picture at the left shows the fibrous structure of wrought iron. How this differs from the crystalline structure of steel is readily apparent. It is the presence of many thousands of tiny threads of glass-like iron silicate that gives wrought iron this unique fibrous structure and it is this structural feature, duplicated in no other metal, that gives wrought iron its superior resistance to corrosion and fatigue stresses.

While the initial cost may be higher, actual service records in numerous applications prove that wrought iron is the most economical buy because it lasts longer. Ask any Byers Field Service Engineer to show you fractured pieces, similar to those illustrated above. Write for our booklet, "The ABC's of Wrought Iron."

A. M. Byers Company, Pittsburgh, Pa. Established 1864. Boston, New York, Philadelphia, Washington, Atlanta, Chicago, St. Louis, Houston, San Francisco. Export Department: New York, N.Y.

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CORROSION COSTS YOU MORE THAN WROUGHT IRON

WROUGHT IRON

TUBULAR AND HOT ROLLED PRODUCTS

ELECTRIC FURNACE QUALITY STEEL PRODUCTS

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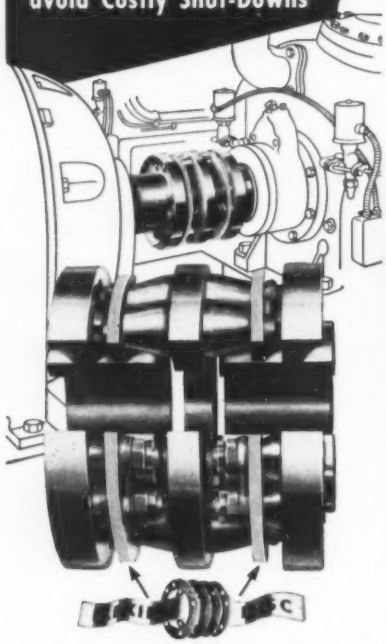
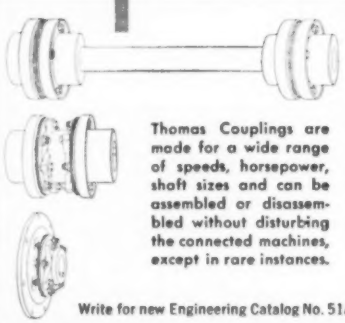
Specify THOMAS ALL METAL
FLEXIBLE COUPLINGS
for Power Transmission to avoid Costly Shut-Downs



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

Write for new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA, U.S.A.

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'ROUND ABOUT

ductive capacity of packaged air contioners . . . **Union Special Machine Co.** is increasing its manufacturing facilities with an addition to Plant No. 2 at Huntley, Illinois . . . An addition is planned for the present manufacturing facilities at **SPO, Incorporated's** Cleveland, Ohio plant . . .

Managers of General Electric's Industrial Heating Department inspect scale model of new plant for Shelbyville

General Electric Co. will begin construction of a new plant at Shelbyville, Indiana, to manufacture industrial furnaces, induction heating equipment and heating devices (see illustration) . . . An expansion of aluminum sheet rolling and finishing facilities is planned for the Trentwood Works at Spokane, Washington, for **Kaiser Aluminum & Chemical Corp.** . . . **Chicago Pneumatic Tool Co.** recently completed a new plant designed and constructed by Walter Kidde Constructors, Inc., in Fort Worth, Texas, and is now producing a complete line of drilling equipment for the petroleum industry.

National Power Show

ANNOUNCEMENT was recently made that the 21st National Exposition of Power and Mechanical Engineering will be held at the Commercial Museum in Philadelphia, December 2 to 7.

As in recent years, the exposition will be held under the auspices of the American Society of Mechanical Engineers, whose annual meeting is scheduled in New York, November 28 to December 3. For this reason, the exposition was jointly planned to open on Thursday, during the week of the meeting, and continue through Tuesday of the following week.

Arrangements for the show are under the management of the International Exposition Co., 480 Lexington Ave., New York 17, N. Y., with Charles F. Roth as manager, and E. K. Stevens, associate.

Electrical Engineers' Meeting

FIFTY SESSIONS, sponsored by the five technical divisions of the American Institute of Electrical Engineers, will be held at the Institute's fall general meeting in the Morrison Hotel, Chicago, from October 11 to 15.

Special emphasis will be on electrical aspects of air transportation, with eight sessions planned on this subject. The Power Division is planning sessions on carrier current, insulated conductors, power generation, protective devices, relays, rotating machinery, switchgear, system engineering, transformers and transmission and distribution. The Science and Electronics Division plans sessions on computing devices, electrical techniques in medicine and biology, electronics and nucleonics.

The Industry and General Applications divisions will sponsor programs on chemical, electrochemical and electrothermal applications, feedback control systems, general industry applications, industrial power system, land, air transportation, production and application of light.

When Should You Modernize Electrical Distribution System?

WHEN SHOULD an industrial or commercial electrical distribution system be modernized? You may find the answer to this question in Westinghouse Electric Corporation's traveling show, entitled "Chain Reaction."

The show relates the story of a tool works president who faces a dilemma: Should he sit tight because business is slow, or should he modernize the electrical distribution system to cut losses due to breakdowns and resulting high maintenance? It emphasizes the chain reaction effect his decision to modernize his distribution system has on other local businesses.

This traveling show will be presented to plant and office building owners and managers in nearly 100 cities across the country during the latter half of 1954.

Information on when this show may be in your town may be had by writing to R. V. McGahey, Technical Publicity, Westinghouse Electric Corporation, Pittsburgh 30, Pa.

New Plant Engineer

Alan D. Hinrichs was recently appointed plant engineer for Refined Syrups & Sugars, Inc., of Yonkers, New York.

In his new position, plant engineer Hinrichs will be responsible for the maintenance of the company's plant and property, installation of new processes, structures and equipment, powerhouse operation and operation of the company's liquid sugar truck fleet.

Formerly project engineer and assistant plant engineer, he joined Refined Syrups as an assistant engineer in 1946, after serving as an officer in the Navy Air Force.

How to make certain your pipe hanging jobs are

RIGHT ON THE BEAM

EASY TO INSTALL AND ADJUST AFTER PIPE IS ERECTED

THERE'S A STOCK GRINNELL HANGER FOR EVERY PIPING REQUIREMENT

With Grinnell Pipe Hangers you get better, stronger installations in less time. You not only save money on assembly — but on costly call-backs and maintenance, because Grinnell Hangers permit adjustment *after* pipe is erected. This makes it easy for you to correct sagging pipe, water traps . . . to provide positive drainage for the entire system.

Remember, there's a stock Grinnell hanger for every piping installation . . . from a simple water pipe to a high pressure, high temperature steam line. Where necessary, there are Grinnell engineered hangers to compensate for thermal movement.

Make sure your piping installations are *right on the beam.* Let Grinnell supply the correct hangers to meet all your needs. Grinnell hangers comply with piping code requirements.

GRINNELL

AMERICA'S #1 SUPPLIER OF PIPE HANGERS AND SUPPORTS

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports
Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems

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new
. . . and more efficient, too!

• Custom-designed for regular production!

• Built for a lifetime of service!

LELAND LOADSTAR MOTORS

Here are LELAND'S outstanding qualifications for producing the finest of motors to the new NEMA standards:

★ Extensive and continuing experience in developing and producing, for our Armed Forces, hundreds of thousands of *portable* generator units and *airborne* inverter units and controls. Leland designs consistently meet and frequently surpass specifications so satisfactorily that they virtually become the criteria for other suppliers.

★ More than 33 years' "creative electrical engineering" experience in supplying manufacturers with high-quality custom-built special motors, or standard LELAND motors adapted to the particular requirements of their products.

★ The combined, industry-wide engineering and development resources of American Machine & Foundry Company.

★ A unique combination of modern, mass-production facilities and custom craftsmanship, resulting in extra care in critical operations and greater versatility in production.

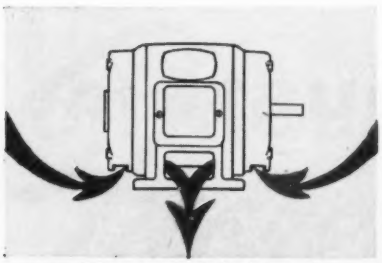
A completely new line of motors!

more power-packed . . . *higher in efficiency* . . . lighter in weight . . . smaller . . . better protected . . . quieter running . . . more efficiently cooled . . . more flexible . . . easier to install . . . modern in appearance . . . and maintenance-free!

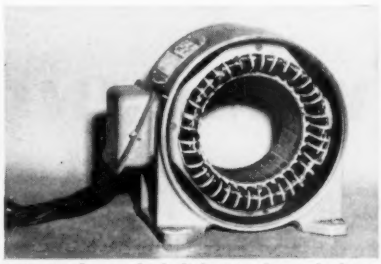
COMPARE this new polyphase, dripproof LELAND *"Loadstar"* motor point by point, feature by feature—the way we do at the factory—with all leading makes of motors! See if you, too, don't find it even further ahead of competition than previous LELAND motors, prior to rerating!

Users of LELAND motors have been enjoying outstanding performance, extra capacity and greater durability for a long time . . . perhaps unaware that these characteristics were often due to LELAND's advance use of improved electrical steels and high-dielectric insulating materials, which have *made possible* the new NEMA ratings!

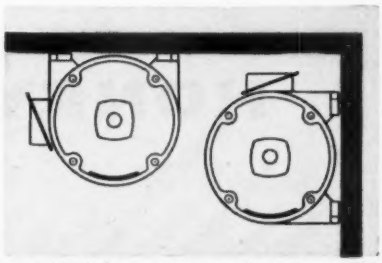
This completely new line of *"Loadstar"* motors carries over, with added refinements, many time-proved LELAND features. Others, entirely new, reflect LELAND's unique experience and creative engineering. Some of these are shown below. For the complete story and frame dimension details, *write for Bulletin No. 103.*



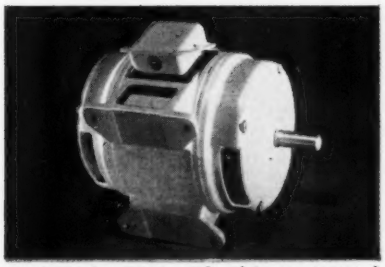
Cooling: (by convection) dual fans draw air in both ends, discharge through center vents; (by conduction) through partial stator-core-to-outer-shell contact, shown in cut at right.



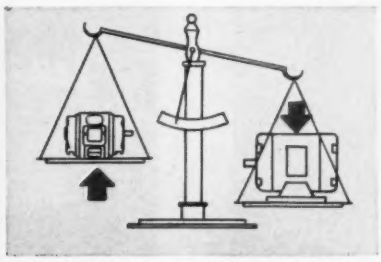
Leland's denser, high-dielectric slot and phase insulation takes less room, permits more copper in each slot, increases efficiency and aids heat transfer.



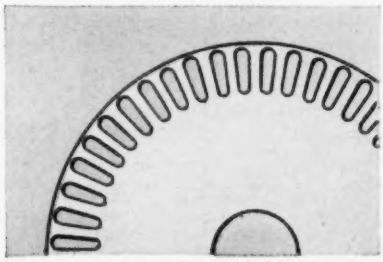
End shields have openings only in lower 70° . . . can be rotated for dripproof mounting on wall or ceiling. Drip cover provides for vertical dripproof mounting.



Rigid cast iron center and end frames (painted gray) assure accurate rotor alignment.



New motors take up to 40% less space; save as much as 33% in shipping weight.



Closed rotor slots and preloaded ball bearings eliminate whir and rattle heard in many motors.

New "Loadstar" polyphase, dripproof motors in 1, 1½ and 2 HP (180 frames) now ready. Totally enclosed and explosion-proof frames—also higher horsepower and single phase motors—available soon.

Another AMF Product

LELAND MOTORS

LELAND motors in previous NEMA standard frames will continue to be available for replacement and the convenience of present customers.

THE LELAND ELECTRIC COMPANY, DAYTON 1, OHIO, *Division of American Machine & Foundry Company*

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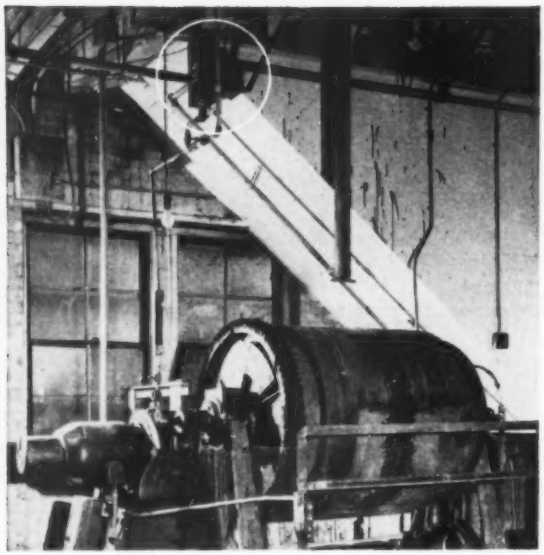
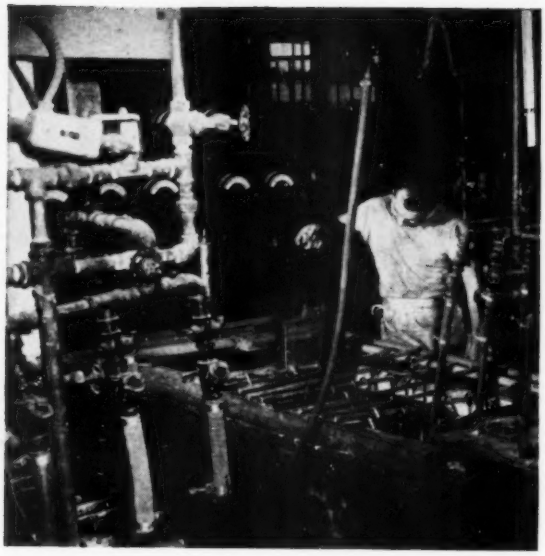


Paint quality is improved *in the grinding phase now that Honeywell Temperature Controls are used at the Western Paint & Varnish Co., Duluth, Minn. These controls help maintain a constant temperature in a steel ball mill for grinding paint.*

Honeywell Controller Cost—$113.40*



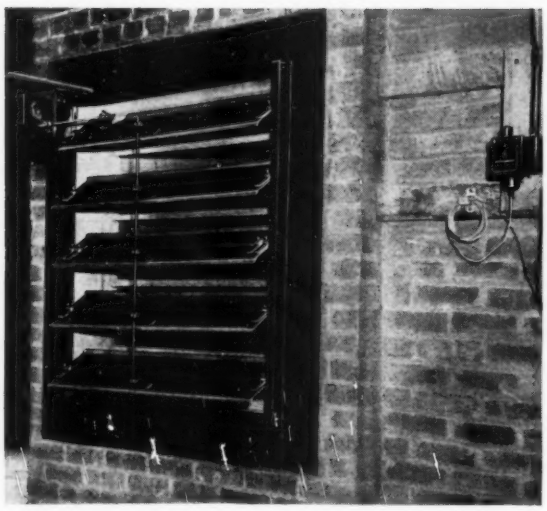
Temperature control of plating solutions *is maintained by Honeywell Remote Bulb Controllers at the Kingsboro Electrotype Corp., Brooklyn, N. Y. Now harmful temperature fluctuations are prevented and quality of electrotypes is improved.*

Honeywell Controller Cost—$29.00*

HONEYWELL INDUSTRIAL

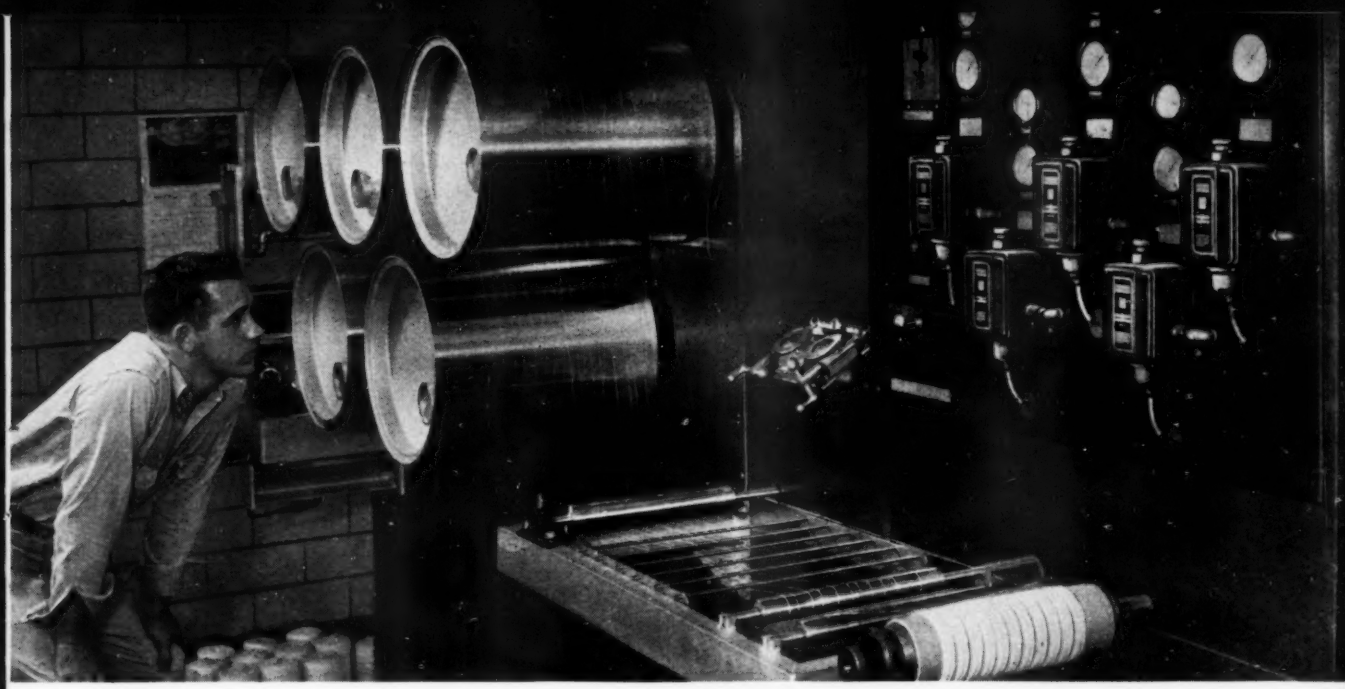
Atmospheric "conditioning" *of laminated wall panels at the Upson Company's Lockport, N. Y. plant is regulated by the Honeywell Controls pictured here. Higher quality embossing is attained when moisture content of panels is standardized through a controlled ventilating system.*

Honeywell Controller Cost—$266.40*



Better ware is the result *of controlled drier temperatures at the Jenkins Brick Co., Montgomery, Ala., thanks to installation of Honeywell Temperature Controllers and automatic louver dampers in the drier.*

Honeywell Controller Cost—$131.80*



Scientific drying of freshly sized yarns *in this Monsanto Chemical Company's experimental slasher is regulated by a Honeywell T415 Temperature Controller which insures proper drying speed to give highest quality yarn. Note individual controller for each drying drum on panel at right.*

Honeywell Controller Cost—$28.40* each

CONTROLS *Increase quality*

QUALITY of product can often be markedly increased by the application of a surprisingly simple improvement in plant operation at remarkably low cost.

For example, the unregulated drying speed of freshly-slashed yarns formerly resulted in a sizing-coating being either too soft or too brittle . . . affording little protection for yarn during weaving. An experimental slasher recently proved that, through the use of Honeywell Industrial Controls, drying speed could be so regulated as to insure consistently dried sizing, providing a stronger yarn and a better quality product.

Similarly, throughout the manufacturing world, versatile Honeywell Controls are called upon to increase product quality in hundreds of different ways.

Low-cost Honeywell Controls are uncomplicated in application and in construction . . . designed to perform a job effectively, inexpensively.

Throughout your plant there are many opportunities for Honeywell Controls to improve your product . . . as well as speed production, lower maintenance, reduce costs.

Your nearby Honeywell sales engineer will be glad to discuss how *you* can *increase quality* through the use of these controls. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

Also manufacturers of a complete line of precision measuring, recording and controlling instruments.

MINNEAPOLIS **Honeywell**

First in Controls

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Fit it up FAST and at LOW COST
with standard HALLOWELL Shop Equipment

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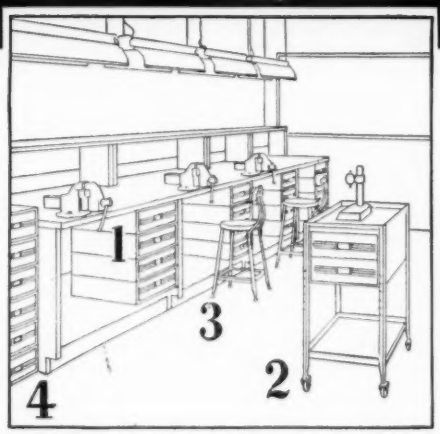

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3. Stools and Chairs
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Whatever national industrial show you attend, whatever the machinery or equipment is for,—the construction field, packaging, oil industry, materials handling, mining, woodworking, textile, farm, food or chemical,—year after year you will observe the great preponderance of Diamond Roller Chains on the finest machinery and equipment displayed.

The roster of these machinery and equipment builders includes the best known and respected names in American Industry—firms staffed by foremost engineering and manufacturing executives.

Smooth-operating, high efficiency Diamond Chains are used for drives from the motors, shaft to shaft, and one shaft to several shafts. And you'll find them with various attachments for conveyor flights, timing operations, etc.

For miscellaneous motor and plant drives or for new or redesigned machinery, you will benefit by insisting on the chain that is the choice of America's leading machinery and equipment builders.

DIAMOND CHAIN COMPANY, Inc.

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Dept. 614, 402 Kentucky Ave., Indianapolis 7, Indiana

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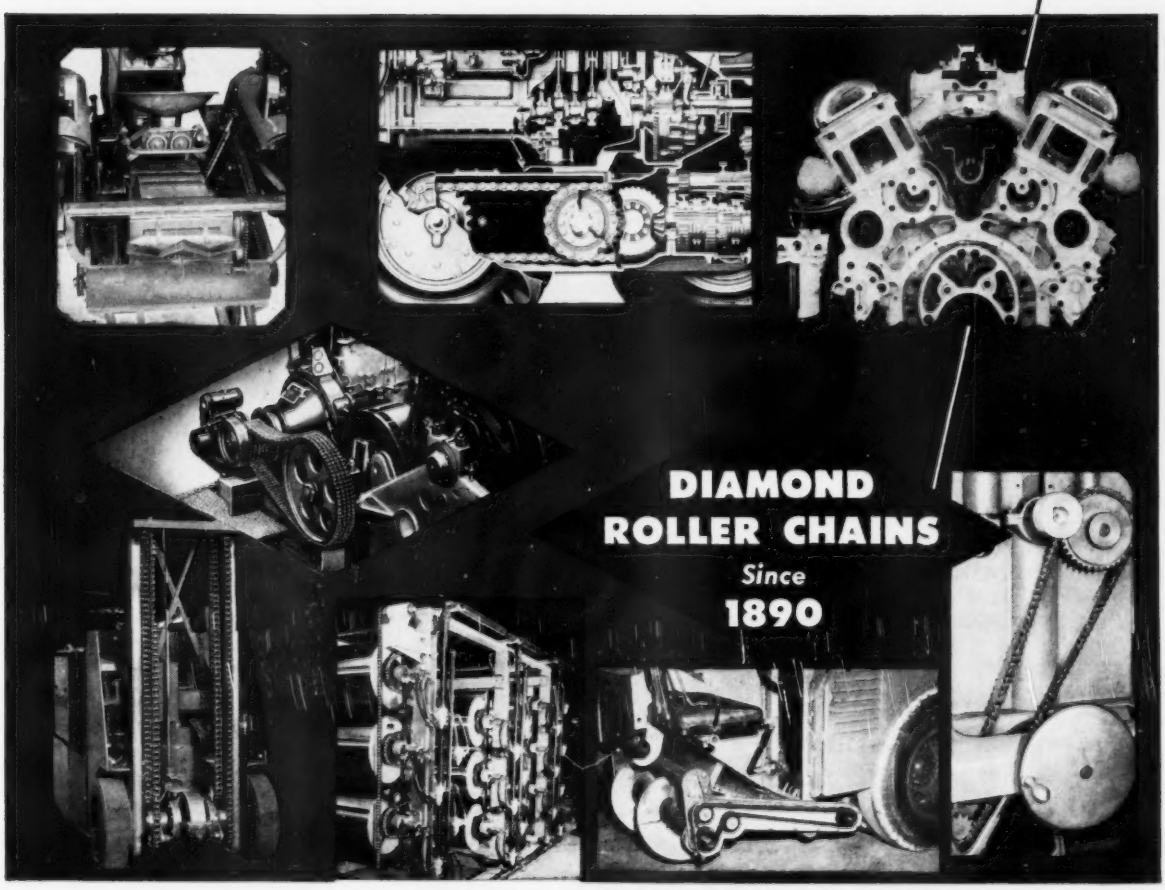

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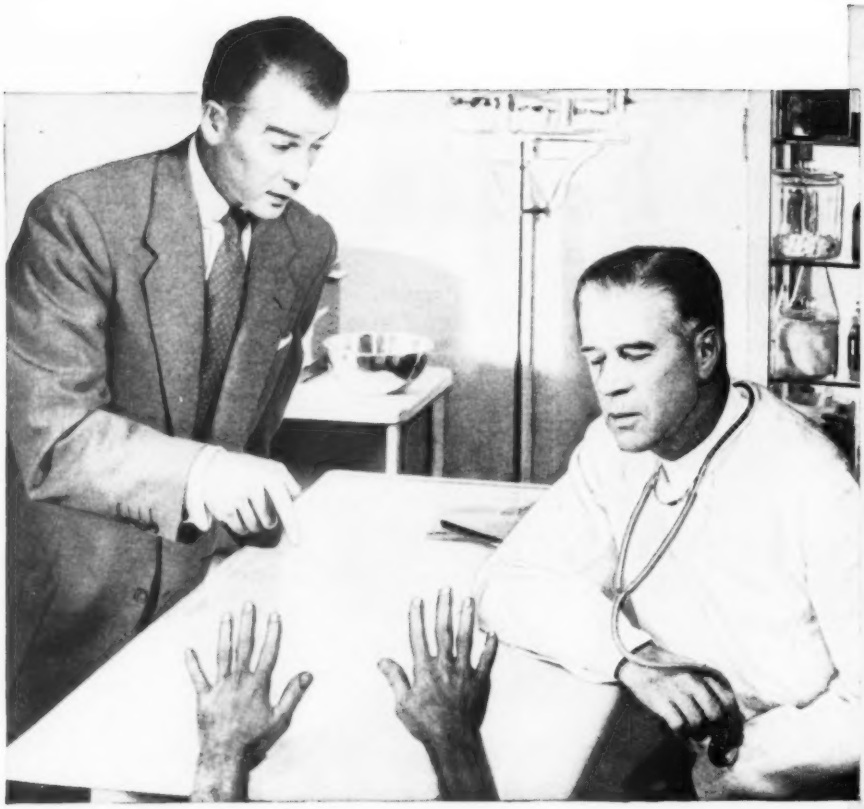


LET'S START WITH THE CAUSES OF *DERMATITIS*

Costly dermatitis can be prevented. By getting at the basic causes. We can help you by analyzing the work your employees do, checking for hazards our experience tells us might cause dermatitis. We'll check the care given their hands. Then we'll compare your present protective treatments with the skin care methods we've found to be best during our many years of controlling industrial dermatitis.

Where it is necessary, we offer consultation with specialists. Complete chemical and bacteriological analysis.

After these preliminaries we can help you set up a *continuing program* for dermatitis control. Provide leaflets and posters to help educate employees. Assist you in choosing the particular products from West's broad line that will best apply to your situation. At the right are a few examples.

Let's see how WEST products control dermatitis

West's complete line of sanitation products includes hand cleaners, protective creams, antiseptic soaps and protective garments. Everything you need for effective control of dermatitis. Here are a few of them.

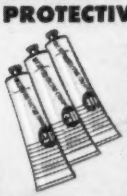
LAN-O-KLEEN

is a heavy duty powdered hand cleaner. Contains a relatively high percentage of "free" lanolin, the emollient lecithin, soap, and balanced alkalis blended together by a secret process in a fine corn meal base. Provides both super-fatting and effective cleaning.

ANTISEPTIC SULPHO HAND CLEANER

contains bacteriostatic properties. Will not defat the skin. Excellent skin cleaner even for sensitive hands. Offers protection against many harsh chemicals and other materials used by people in industry and institutions.

ANTISEPTIC PROTECTIVE CREAMS



contain bacteriostatic properties. Formulated to provide protection against almost every occupational hazard. Used by thousands of workers throughout the United States and in Canada.

WANT DETAILS?

Tear out this coupon and mail with your letterhead

Dept. 52

I'm Interested in:

☐ A FREE booklet packed with information on dermatitis and helpful tips on skin care.

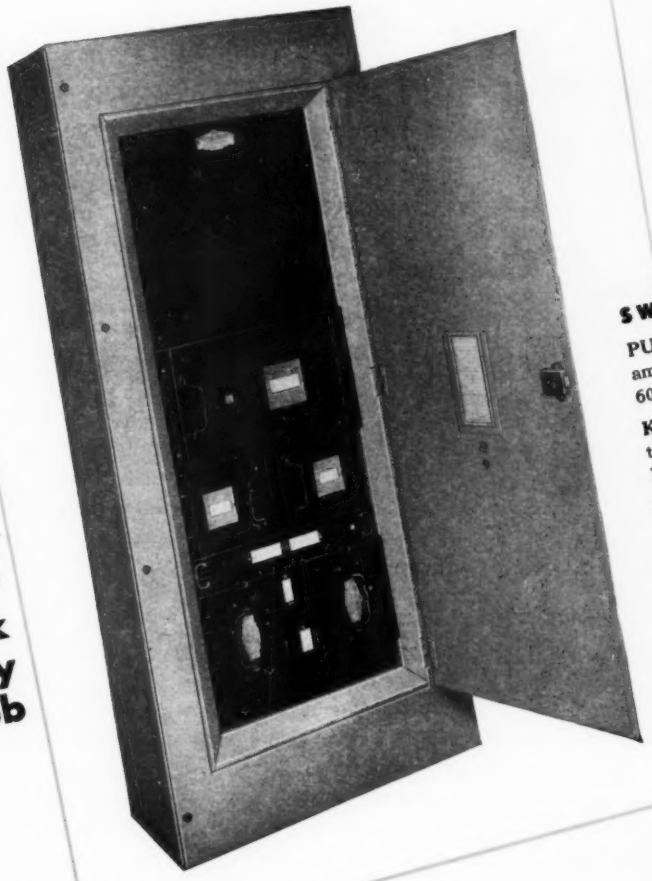
☐ A talk with a West specialist about my dermatitis problem. No sales pitch. No obligation. Just discussion, a look at samples, and a demonstration if I want it.

WEST DISINFECTING Company

West's broad line of products includes not only cleaners, soaps, and protective creams but also washroom service . . . disinfectants . . . deodorants . . . insecticides . . . floor maintenance materials. West is also the exclusive distributor of Kotex Sanitary Napkins sold through vending machines.

42-16 West Street, Long Island City 1, N. Y.

For more facts circle 510 on Reply Card



Order from Stock for Quick Assembly on the Job

switch capacities

PULFUZSWITCH — 30 to 100 amps, 250 volts and 30 and 60 amps, 600 volts.

KLAMPSWITCHFUZ — 30 to 200 amps, 250 volts AC or DC.

SNUFARC — 30 to 200 amps, 600 volts AC, 2, 3 and 4 poles.

Main Capacities — 250, 400 and 600 amps, 250 or 600 volts in six basic assemblies.

Above illustration shows "On the Job" assembly of combination Klampswitchfuz and Pulfuzswitch Panelboard.

Feeder Distribution PANELBOARDS

Pulfuzswitch, Klampswitchfuz and Snufarc feeder distribution panelboards are now available on the "panel base assembly" plan, which means that you can order these popular panelboards right out of stock for quick and easy assembly on the job.

All components of each type of panel — box, front, panel back, main bus bars and lug connections, neutral bar and 2¼ inch adjustable cover — are compactly packaged and are being stocked by FA distributors for the convenience of contractors, engineers and others. Switch units are separately packaged also.

Approved by the Underwriters' Laboratories, Inc., for label service, these panelboards are the finest in safety and efficiency. All switch units are of the operating type and horsepower-rated. They combine switch and fuse in one unit so that the current is "Off" when fuses are accessible. For maximum efficiency, all current-carrying switch and fuse contacts are heavily silver-plated and fuseholders clamp under pressure.

The next time you need a feeder distribution panelboard, ask for FA.

• For further information, see your FA distributor or consult a FA representative listed in Sweet's Industrial Construction, and Plant Engineering file.

see our catalog in S INDUSTRIAL CONSTRUCTION FILE or write for copy

see our catalog in S LIGHT CONSTRUCTION FILE or write for copy

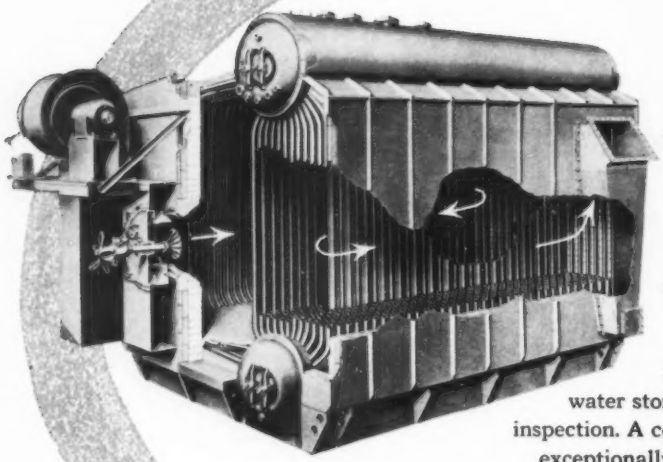
Frank Adam Electric Co.

P. O. BOX 357 • ST. LOUIS 3, MISSOURI

Makers of: BUSDUCT • PANELBOARDS • SWITCHBOARDS • SERVICE EQUIPMENT • SAFETY SWITCHES • LOAD CENTERS • QUIKHETER

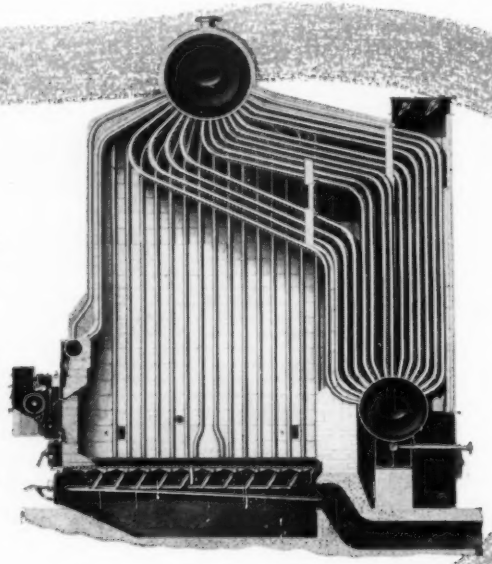
For more facts circle 511 on Reply Card

STANDARD BOILERS THAT



C-E Package Boiler, Type VP

This completely shop-assembled boiler is available in fourteen sizes from 4,000 to 40,000 pounds of steam per hour . . . for operating pressures up to 500 psi . . . for pressure firing of liquid or gaseous fuels. The VP Boiler has more water-cooled area per cubic foot of furnace volume than any other boiler of its size and type. The large lower drum — 30-inch diameter — permits a simple, symmetrical tube arrangement . . . greater water storage capacity . . . easy access for washing down or inspection. A centrifugal fan, which operates at low speed and is exceptionally quiet in operation, is standard equipment. The simple baffle arrangement results in low draft loss . . . simple soot blowing . . . no dead pockets . . . high heat absorption. The VP is enclosed in a reinforced, gastight, welded steel casing, and shipped completely assembled with firing equipment, fittings and forced draft fan. For foundation, it needs only a simple concrete slab.



C-E Vertical-Unit Boiler, Type VU-10

The VU-10 is available in nine sizes from 10,000 to 60,000 pounds of steam per hour . . . for operating pressures up to 475 psi . . . superheat to 200 F in 20,000-60,000 lb range . . . for solid, liquid, or gaseous fuels. This boiler is a completely standardized design adaptable to many conditions. It is bottom-supported and needs no outside supporting steel. It operates efficiently over a wide range of output, and is easy to operate and to maintain. All parts are easily accessible for inspection. The VU-10 is a complete unit — boiler, furnace setting, fuel-burning equipment, controls, forced draft, heat recovery equipment (if desired). Regardless of fuel, the same general cross-sectional arrangement of drums, convection bank and furnace wall cooling is used. Uniform design through each transverse section assures even water level in the drum and uniform expansion.

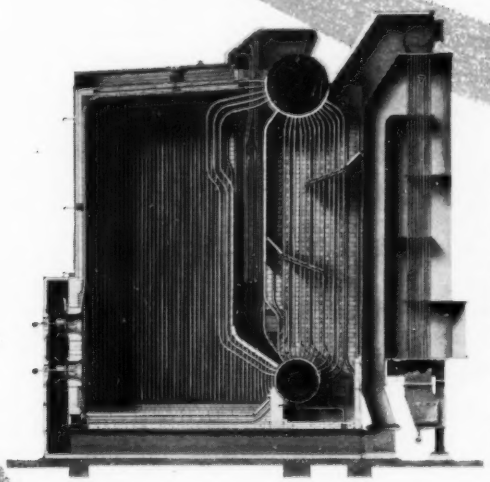
BOILERS, FUEL BURNING AND RELATED EQUIPMENT; PULVERIZERS, AIR SEPARATORS AND

SET INDUSTRY STANDARDS

Whatever your needs for steam may be, in the complete C-E line of fuel burning and steam generating equipment, you will find a type and size just right for your plant.

In the moderate capacity range, for example – that is, from 4,000 to 120,000 pounds of steam per hour – the three *completely standardized* C-E Boilers shown here offer advantages of economy and over-all performance that make them standout values in their respective fields of application.

These C-E Boilers are manufactured for the highest standards of performance, under a wide range of fuel requirements and operating conditions. Yet, because they are so fully standardized, their cost is well within the reach of the industrial budget.



C-E Vertical-Unit Boiler, Type VU-55

The VU-55 Boiler is available in six sizes from 50,000 to 120,000 pounds of steam per hour . . . for operating pressures of 250 psi or 500 psi in each size . . . with superheat and heat recovery equipment if desired . . . for liquid or gaseous fuels. Like the VU-10, this boiler is of symmetrical design, each transverse section being identical with every other section. Thus the gas temperature entering the boiler bank is constant across the full width of the unit. No outside supporting steel is needed, since the boiler is bottom-supported. The basic design for the VU-55 was originated by Combustion in 1925 and has achieved wide acceptance among steam-power engineers everywhere. Its narrow, high furnace . . . integral design of boiler and preheater . . . absence of exterior ductwork . . . and the compactness resulting from modern, coordinated design – all help the VU-55 reach a standard of economic performance closely approaching that obtained in large central power stations.

Other C-E Industrial Boilers

In addition to the standard boilers shown here, the Combustion line includes many other 2-drum designs available for capacities up to 350,000 pounds of steam per hour, which can be designed to burn any commercially available fuel. These units are available for use with pressures up to 1375 psi and steam temperatures as high as 960 F. They may incorporate heat recovery equipment of any type, and can be arranged for difficult space conditions. So – whatever your steam needs – call Combustion for details on the complete line of C-E Industrial Boilers.

B-767

COMBUSTION ENGINEERING

Combustion Engineering Building, 200 Madison Avenue, New York 16, N. Y.

FLASH DRYING SYSTEMS · PRESSURE VESSELS · AUTOMATIC WATER HEATERS · SOIL PIPE

For more facts circle 512 on Reply Card

JENKINS PRACTICAL PIPING LAYOUTS 73

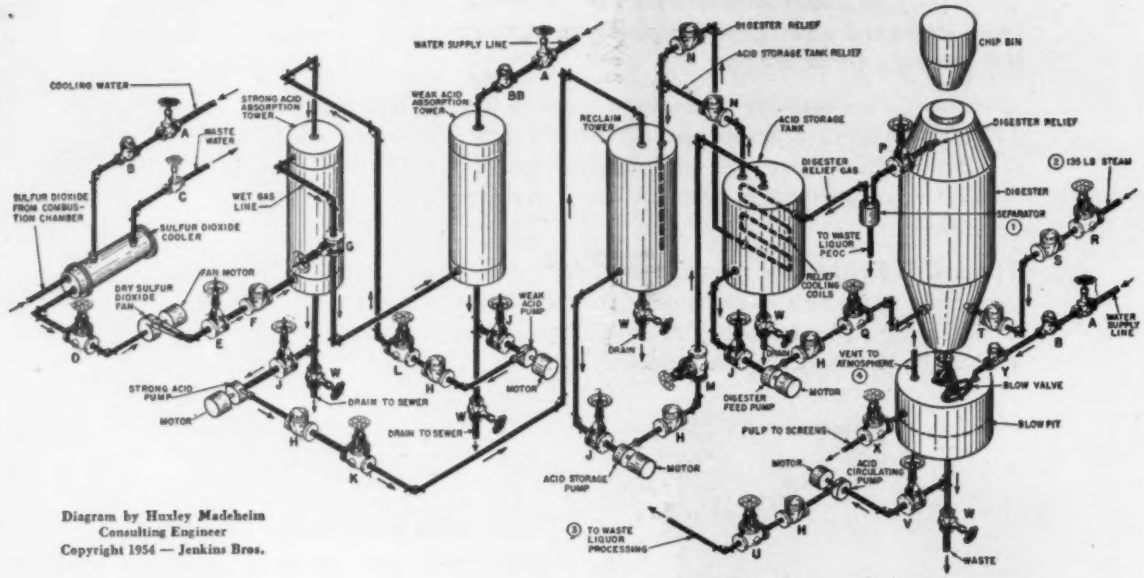


Diagram by Huxley Madeheim
Consulting Engineer
Copyright 1954 — Jenkins Bros.

VALVE RECOMMENDATIONS
For details of Jenkins Stainless Steel Valves, write for Bulletin 200.

Code	Quan.	JENKINS VALVE	SERVICE
A	3	Fig. 106-A, Bronze Globe	Water supply control
B	2	Fig. 352, Bronze Swing Check	Water line secondary check
BB	1	Fig. 1328, Stainless Steel Swing Check	Water line check
C	1	Fig. 47-U, Bronze Gate	Cooler water shutoff
D	1	Fig. 613, I.B.B.M. Globe	Sulfur dioxide fan control
E	1	Fig. 651-A, I.B.B.M. Gate	Gas shutoff
F	1	Fig. 1331, Stainless Steel Swing Check	Prevent strong acid backflow to SO_2 fan
G	1	Fig. 1307-A, Stainless Steel Gate	Gas shutoff
H	5	Fig. 1331, Stainless Steel Swing Check	Prevent backflow to pump
J	4	Fig. 1307-A, Stainless Steel Gate	Pump suction shutoff
K	1	Fig. 1317, Stainless Steel Globe	Strong acid pump discharge control
L	1	Fig. 1317, Stainless Steel Globe	Weak acid pump discharge control
M	1	Fig. 1317, Stainless Steel Globe	Acid storage pump discharge control
N	2	Fig. 1331, Stainless Steel Swing Check	Prevent gas backflow
P	1	Fig. 1307-A, Stainless Steel Gate	Digester relief control
Q	1	Fig. 1317, Stainless Steel Globe	Digester feed pump discharge control
R	1	Fig. 1040, Cast Steel Globe	Steam control valve
S	1	Fig. 1025, Cast Steel Swing Check	Steam line secondary check
T	1	Fig. 1331, Stainless Steel Swing Check	Prevent acid backflow
U	1	Fig. 1317, Stainless Steel Globe	Acid circulation pump discharge control
V	1	Fig. 1307-A, Stainless Steel Gate	Circulating pump shutoff
W	5	Fig. 1308, Stainless Steel Globe	Drain control
X	1	Fig. 1317, Stainless Steel Globe	Pulp discharge control
Y	1	Fig. 1328, Stainless Steel Swing Check	Prevent acid backflow

How to plan PIPING FOR ACID LIQUOR PREPARATION IN THE SULFITE PULPING PROCESS

The sulfite pulping process calls for a digester solution that is strongly acid. It is prepared by burning sulfur or pyrites to form sulfur dioxide, which is passed through absorption towers containing limestone and water. This produces an acid liquor consisting mainly of calcium bisulfite and sulfurous acid. The wood chips are cooked with this acid liquor at approximately 300°F, by steam admitted as indicated in the diagram.

Pressure is reduced by opening the digester relief valve when cooking is completed. The hot gases pass through the coils in the acid storage tank to preheat the liquor, then back to the reclaim tower where they go into solution. Next, the liquor and pulp are forced into the blow pit by the pressure remaining in the digester. The liquor is drained off and sent to waste, or is processed for by-products. Water, free of impurities which might contaminate the pulp, is then admitted to wash the pulp thoroughly. After this washing, the pulp passes onto screens and eventually to the paper making process.

Valves controlling the dry sulfur dioxide gas (prior to passing through an absorption tower) are iron body bronze mounted. Valves specified for the wet sulfur dioxide gas (after passing through an absorption tower) are stainless steel, because of the corrosive nature of the acid bearing gas. Valves in the liquor lines are Stainless Steel, Type 316, due to the corrosive combination of calcium bisulfite and sulfurous acid. Valves for water and steam lines are bronze, with the exception of the check valves marked "S" and "Y", which are stainless steel due to the possibility of acid liquor or gas backing up.

Consultation with accredited piping engineers and contractors is recommended when planning any piping installation.

To simplify planning, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information.

JENKINS VALVES
LOOK FOR THE JENKINS DIAMOND
SINCE 1864
Jenkins Bros

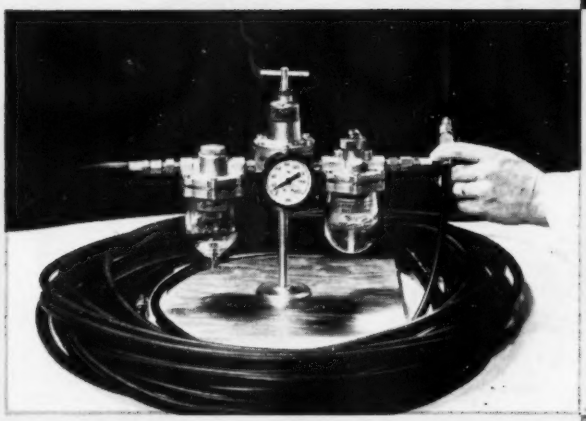
SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS EVERYWHERE

For more facts circle 513 on Reply Card

this is *Norgren*

MICRO-FOG LUBRICATION

Special test chamber in Norgren research laboratory shows the fine, uniform Micro-Fog.



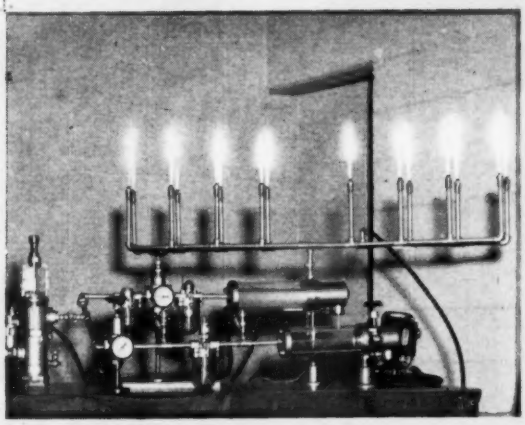
and this is what it can do for you...

Micro-Fog

▲ assures complete lubrication after **traveling through more than 130 ft. of hose**

assures equal distribution of lubricant **through as many as 40 outlets** ▶

Many different models of Micro-Fog Lubricators are available for your lubrication needs on air tools, air cylinders, gear boxes, high-speed spindles, and bearings up to a total of 500 bearing inches.



WRITE, NOW, FOR COMPLETE INFORMATION ON *HOW NORGREN MICRO-FOG LUBRICATION CAN HELP YOU*

- ***cut lubrication and maintenance costs.***
- ***improve equipment performance.***

C. A. Norgren CO.
3443 So. Elati, Englewood, Colo.

PIONEER AND LEADER IN OIL FOG LUBRICATION FOR 26 YEARS

VALVES • FILTERS • LUBRICATORS • REGULATORS • HOSE ASSEMBLIES

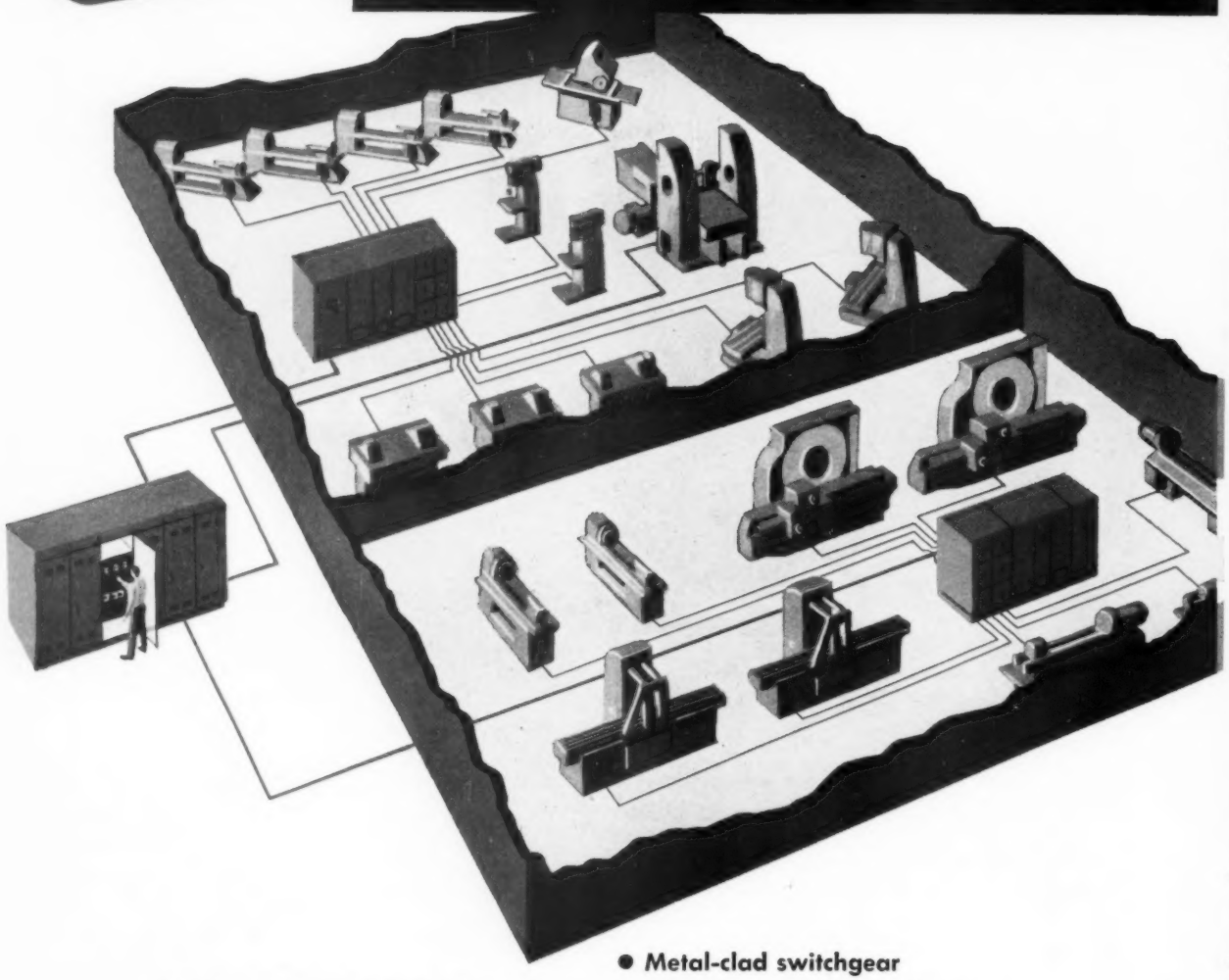
For more facts circle 514 on Reply Card

ALLIS-CHALMERS

PROGRESS IN

Switchgear

modernize



MODERN PLANTS USE these items of electrical distribution equipment.

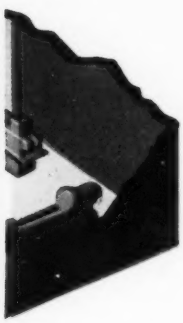
- Metal-clad switchgear
- Load center unit substations
- Bus duct
- Individually enclosed breakers
- Low voltage switchgear
- Frame-mounted oil circuit breakers

ALLIS-CHALMERS

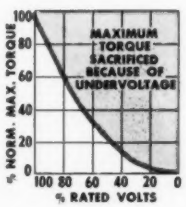
electrically

Cut Operating Costs 6 Ways — Improve your Distribution System With Allis-Chalmers Switchgear

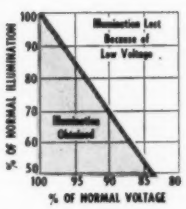
In many plants the electrical system grew piecemeal. New machines were added to existing feeders; long, low voltage feeders were added for new groups of machines — and the whole system became inefficient and even dangerous. If this is the case in your plant, here are some of the losses you can avoid by modernizing with Allis-Chalmers switchgear:



1 Torque loss — Torque and horsepower drop when voltage drops below rated voltage of motors. Jobs take longer, because reduced torque necessitates lighter cuts on machine tools. Major cause of undervoltage is long, low voltage feeders. Placing unit substations at load centers shortens low voltage cable . . . improves voltage.



2 Illumination loss — You get less lumens per dollar when voltage is low. In addition, most studies show workers see better, produce more when illumination level is high.



3 Production loss — Standard Allis-Chalmers switchgear designed to accommodate special circuit schemes that will assure uninterrupted power for automation or continuous processing.

4 Motor burnout — Individually enclosed low voltage circuit breakers at each machine protect motors from faults and from overloads that might cause burnouts . . . protects you from lengthy interrupted production.

5 Space loss — Compact Allis-Chalmers switchgear units fit anywhere. Use non-productive areas such as the roof, basement, balcony or space outside near the building.

6 Power loss — Old breakers in many plants are now inadequate to handle a short circuit because of increased system capacity since the time they were installed. A major fault could cause equipment failures and prolonged outages. If your plant is typical, any breaker over 10 years old is probably inadequate today, because of your increased use of power.

get more information

A-C ALLIS-CHALMERS

Allis-Chalmers switchgear engineers can help you solve your electrical distribution problems. Call your nearby A-C district office, or write for further information.

A-4248

Allis-Chalmers
Milwaukee 1, Wisconsin

Send me new 24-page bulletin "Power at Load Centers Pays Off." (11B6285B)

Name.....

Title.....

Firm.....

Street.....

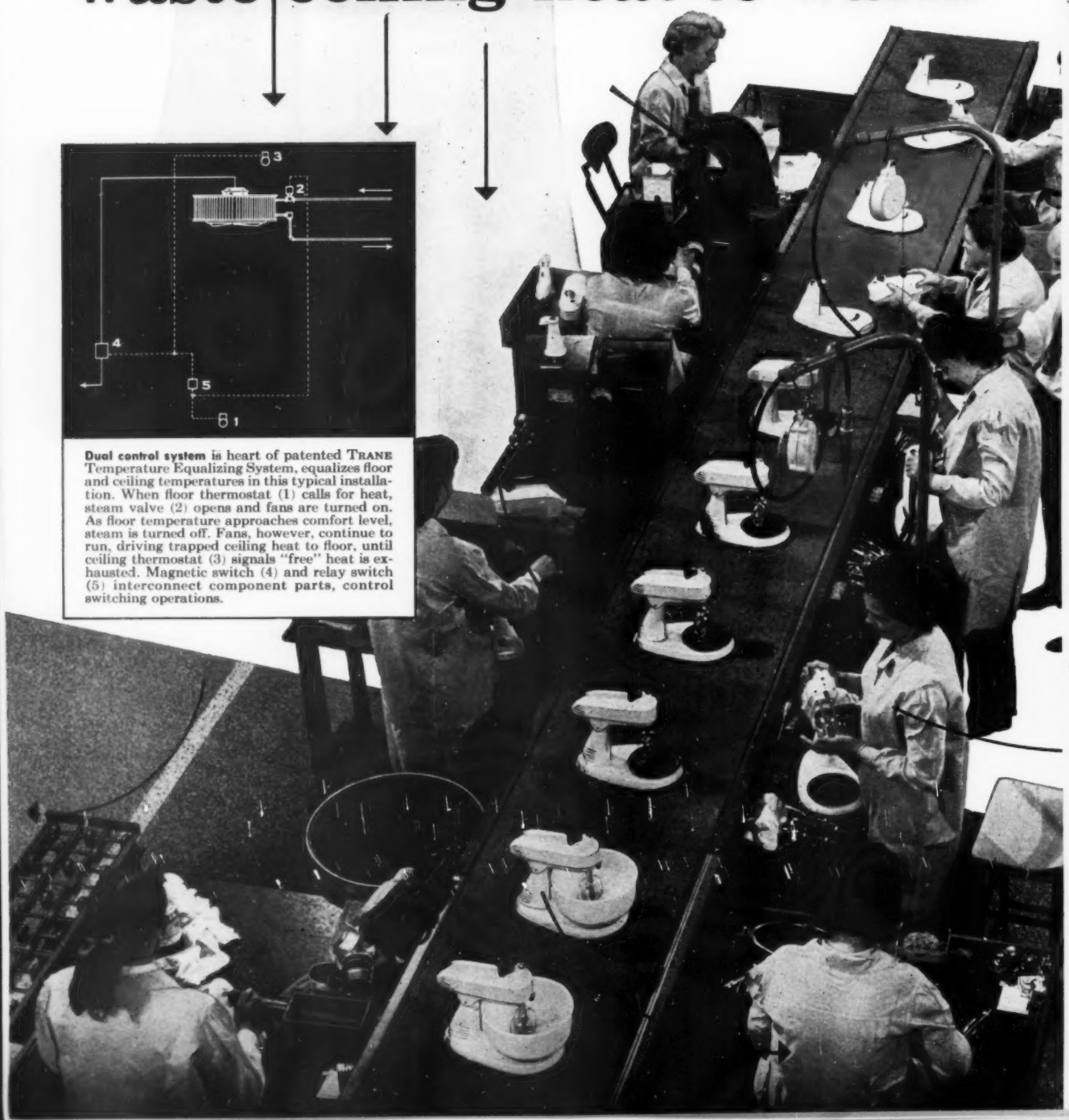
City.....State.....

For more facts circle 515 on Reply Card

PROJECTION HEATER PULLS IN

How Trane waste ceiling heat to warm

Dual control system is heart of patented TRANE Temperature Equalizing System, equalizes floor and ceiling temperatures in this typical installation. When floor thermostat (1) calls for heat, steam valve (2) opens and fans are turned on. As floor temperature approaches comfort level, steam is turned off. Fans, however, continue to run, driving trapped ceiling heat to floor, until ceiling thermostat (3) signals "free" heat is exhausted. Magnetic switch (4) and relay switch (5) interconnect component parts, control switching operations.



WARM AIR TRAPPED BY HIGH CEILING, PUSHES IT BACK TO FLOOR LEVEL

Projection Heaters harness floors, cut fuel costs!

Heaters operate much of the time without using steam!
Exclusive temperature equalizing system drives heat trapped by high ceilings down to worker level, prevents stratification!

Warm air trapped in "heat hungry" high ceilings can be driven back down to the floor again by TRANE Projection Heaters . . . automatically.

With the exclusive TRANE Temperature Equalizing System in operation, ceiling thermostats permit the heater fans to salvage warm ceiling air, push it down to floor level. Floor thermostats turn on the steam only when the "free" heat near the ceiling has been used. Heaters operate part of the time *without using steam!* Stratification is eliminated, fuel costs are cut substantially.

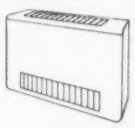
Besides salvaging ceiling heat, you can put heat *exactly where you need it* with TRANE Projection Heaters.

Exclusive patented TRANE Louver Cone Diffusers permit you to divide the air stream . . . spread it . . . or concentrate it into a narrow column for *up to 60% greater throw* so that the heaters can be mounted high above overhead craneways and other obstructions.

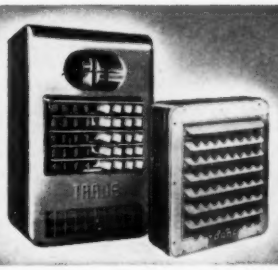
If high ceiling heat waste is *your* problem, contact your nearest TRANE Sales Office for additional information. Ask for free bulletin DS-327B or write TRANE, La Crosse, Wisconsin.

There's a Trane unit heater for every heating need

Projection Heater

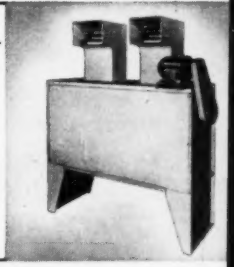


Force-Flo Heater



Trane Torridor blower-type unit delivers large volumes of heated air long distances, with or without ducts.

Trane Horizontal Heaters put heat *where* you want it, *when* you want it. Both conventional Model H and new Gas-Fired Unit Heater have patented TRANE Louver Fin Diffuser.



one source · one responsibility

Install TRANE Unit Heaters

to put heat where you want it at low cost

MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING, VENTILATING AND HEAT TRANSFER EQUIPMENT

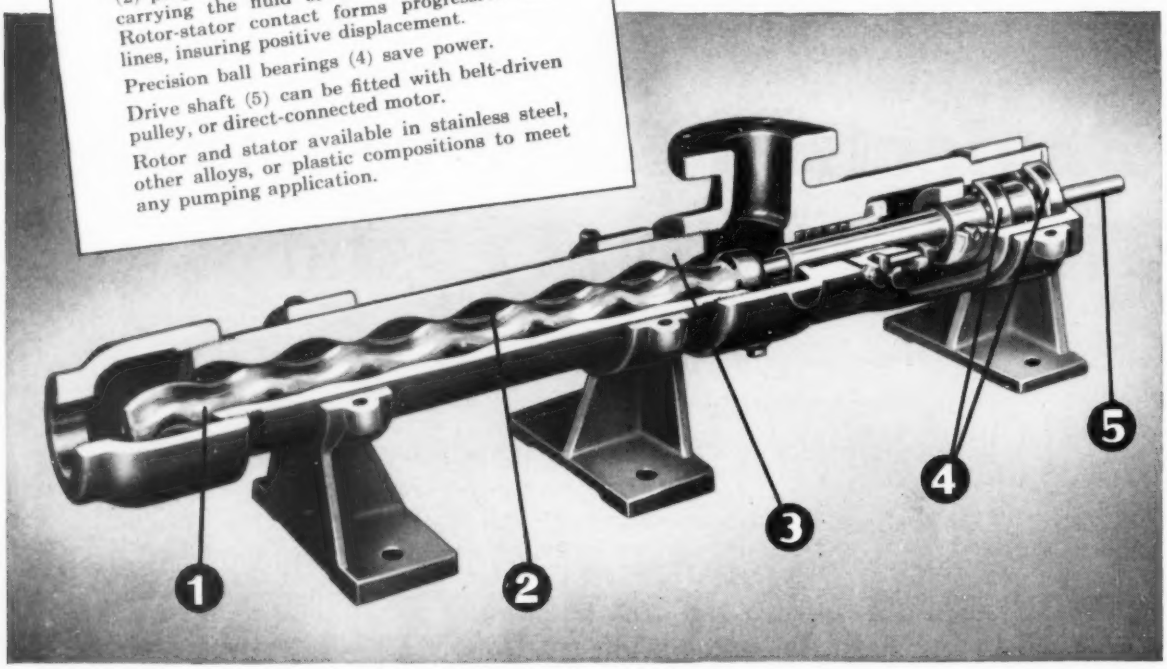
The Trane Company, La Crosse, Wis. • East. Mfg. Div., Scranton, Penn. • Trane Co. of Canada, Ltd., Toronto • 70 U.S. and 15 Canadian Offices

How it works: as the rotor (1) turns, cavities (2) progress toward the end of the stator (3), carrying the fluid or semi-solid with them. Rotor-stator contact forms progressive seal lines, insuring positive displacement.

Precision ball bearings (4) save power.

Drive shaft (5) can be fitted with belt-driven pulley, or direct-connected motor.

Rotor and stator available in stainless steel, other alloys, or plastic compositions to meet any pumping application.



If your pump requirements are a little different...

The entirely different MOYNO® Pump may be exactly what you need!

FACTS ABOUT THE MOYNO

the world's simplest pump

- **Positive Displacement**—Moynos are available to pull up to 29 inches of vacuum while discharging under pressure. Big Moynos can deliver up to 250 gallons per minute, against pressures up to 600 p.s.i.
- **Gentle**—no churning, foaming; won't break up semi-solids.
- **Reversible**—pumps with equal efficiency in either direction.
- **Trouble-Free**—self priming; won't cavitate or vapor-lock. Just one moving part—no valves to stick, no pistons to gum up. Built for tough service, easy to maintain.
- **Versatile**—handles liquids, pastes, abrasive-laden slurries, vacuum applications.

You name the problem! Are your pumped materials viscous, semi-solid, hard to move? Do they tend to disintegrate? Are they abrasive? Do pump maintenance costs seem high? If "yes" is the answer to any of these, find out why Moyno Pumps handle jobs where other pumps fail!

The Moyno is different! The cutaway view above—and the facts listed at left—describe a completely new concept of pump design. They show why the Moyno is a pump you can specify, install and *forget*.

Will it solve your problem? Chances are it will . . . at least there isn't a more versatile pump made! Moynos pump clay for a leading pottery maker. They're being used for handling white water in paper mills . . . for caustics . . . an Eastern food producer is even using them successfully for pumping potato salad!

Get more facts today! An interesting, factual bulletin will tell you more about the simple, versatile Moyno Pump. Write for your free copy of Bulletin PE-103.

ROBBINS & MYERS, INC.

SPRINGFIELD 99, OHIO • BRANTFORD, ONTARIO

Fractional & Integral h.p. Motors & Generators | Electric Fans | Electric & Hand Hoists & Cranes | Moyno Pumps | Propellair Industrial Ventilating Equipment

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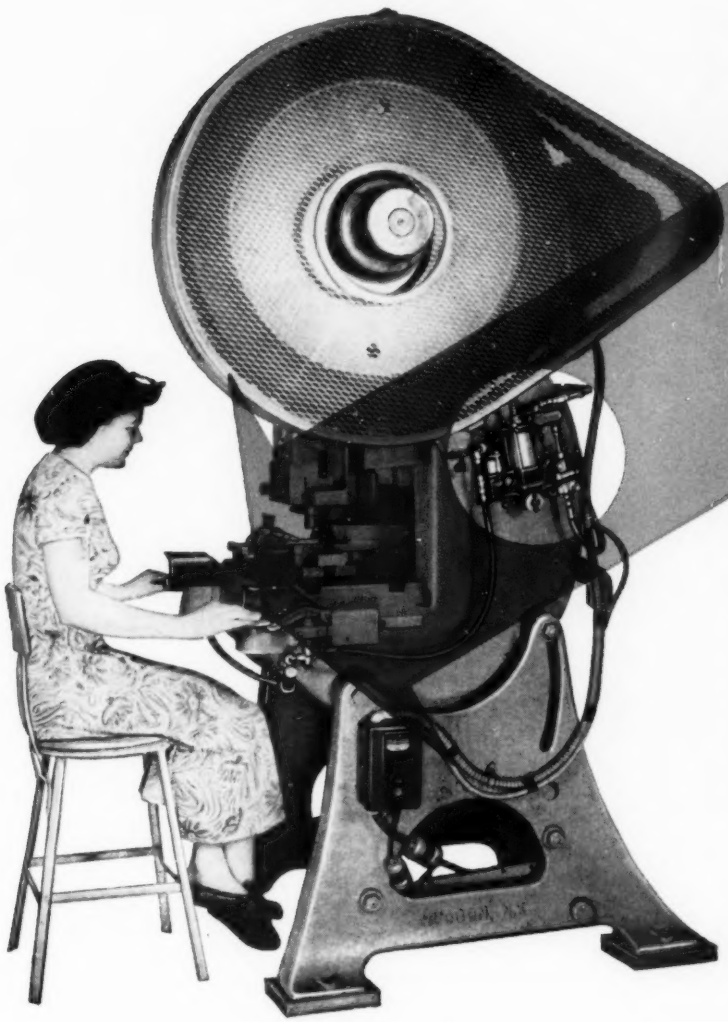

Yes, with the **Schrader Two-Hand Press Control** you'll find operator confidence soars—and so does production—because this easy-to-install unit can be operated only by both hands simultaneously. This means:

1 ***Production hits new highs*** **as operators, no longer worrying about personal safety, develop a new high-speed work rhythm in short order.**

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Look over the mechanical-clutch machines in your shop. Wherever you find operators straining back and leg muscles to maintain production—tiring themselves so that they are less alert to safety precautions—*there's a real need for Schrader Pneumatic Controls.* Available for easy foot operation as well as two-hand operation as shown here, Schrader Control Sets come complete and ready for mounting on your presses.

Ask us to help you decide which of the several Schrader Control Sets will fit your needs best. Simply write us, outlining your installation—or fill out the coupon below.

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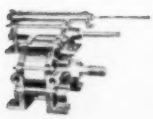

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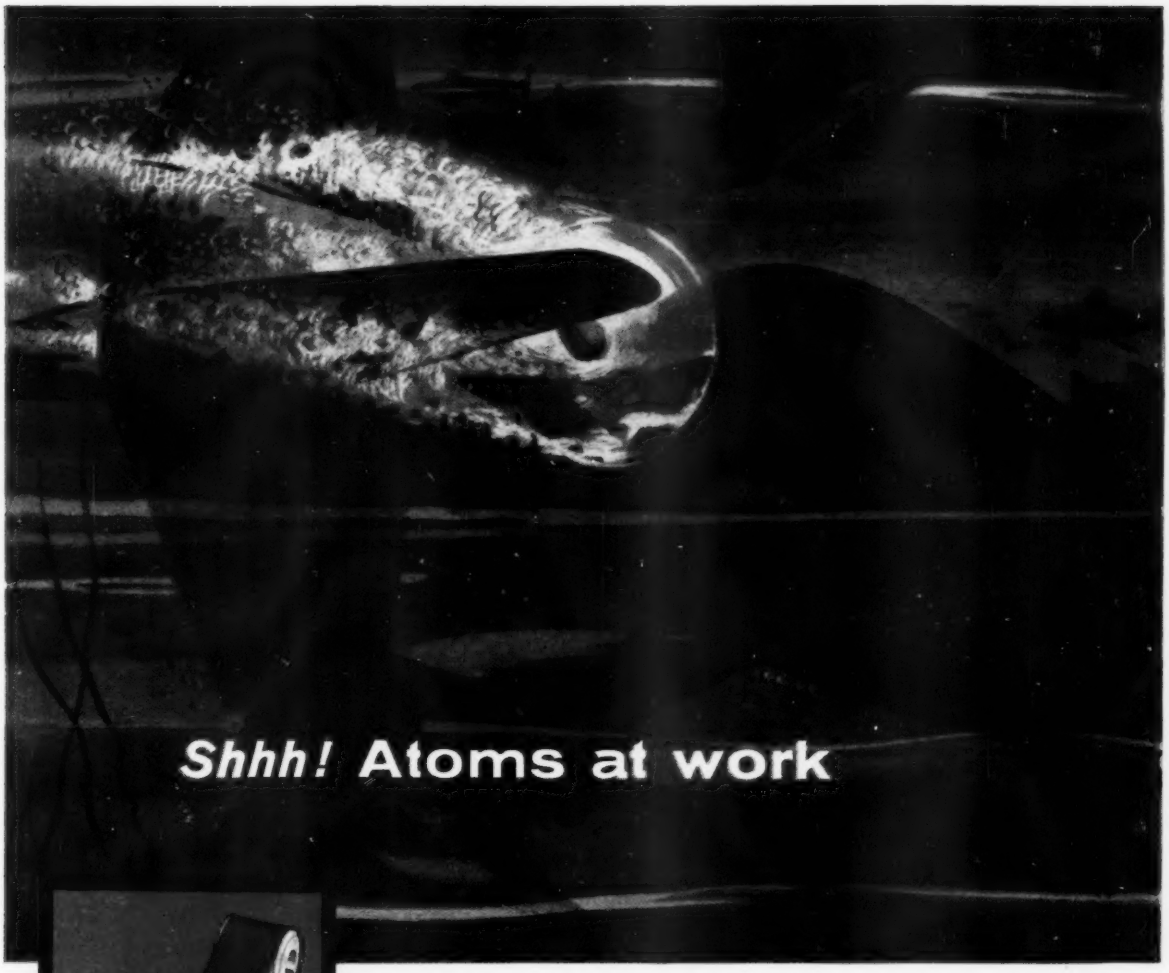

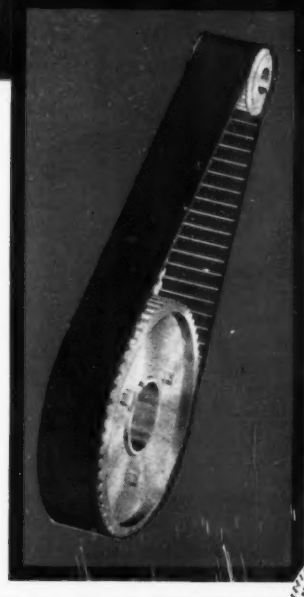

NOT ONLY is the U.S.S. Nautilus the first submarine to be propelled by atomic power! She is also by far the most silent in operation . . . and therefore most difficult to locate by enemy sound-detecting devices and acoustic torpedoes.

To match the uncanny silence of her nuclear-generated-steam turbines, her builders* have wisely employed Gilmer "TIMING" BELTS for certain drives. Since it is the only type of drive that can transmit power at a constant angular velocity *without metal-to-metal contact*, the "TIMING" BELT was a "natural" for tachometer drives and various control drives requiring non-slip operation or accurate calibration.

*ELECTRIC BOAT DIVISION
OF GENERAL DYNAMICS CORPORATION

Security considerations naturally prohibit further elaboration or illustration. We are gratified, however, that this *newest form of power transmission* was chosen by some of the world's best engineering brains to fill a specific need in this first practical application of man's *newest source of power*.

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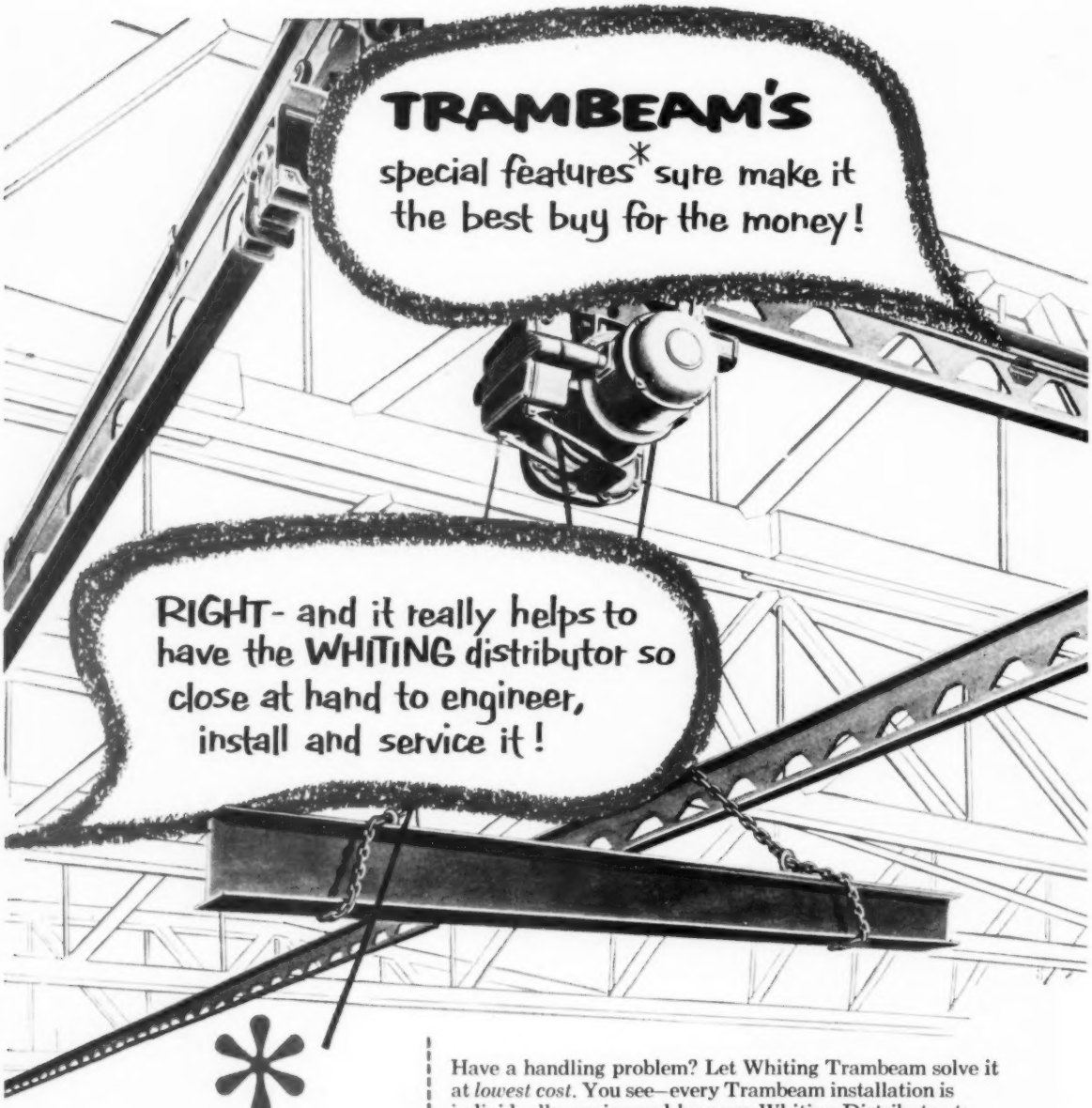
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BULLETINS just released and of immediate plant interest

CONSTRUCTION

101 Acoustical Form Board—This publication describing and illustrating Fiberglas acoustical form board for poured-in-place roof decks gives information on two types of incombustible boards. One of these has a bonded Fiberglas mat facing to provide an attractive appearance as an interior ceiling; the other is sanded on one side for use where smooth ceiling surface is desired. Gives advantages of the form boards, suggestions for installation and painting. Owens-Corning Fiberglas Corp.

102 Acoustical Baffles—This 8-pp engineering report covers use of perforated acoustical baffles as warm air diffusion outlets in a translucent suspended ceiling, in which no objectionable air velocities were found. Includes a table of air flows versus pressures at inlet. The F. W. Wakefield Brass Co.

103 For Prestressed Concrete—Catalog PC-929, 16-pp, gives detailed information and charts on characteristic properties of company's wire and strand, and includes photos of various jobs in which prestressing has been used. Featured are uncoated prestressed concreted strand for pre-tensioned bonded design, anchor fittings for post-tensioned design, and post-tensioned design. Tensioning applications are also illustrated. Construction Materials Div., John A. Roebling's Sons Corp.

104 For Stairway Construction—This 12-pp illustrated booklet describes the use of this company's Junior channels in stairway construction. Provides specifications and shows some of the buildings in which the channels have been used as stair stringers. Tables give sizes and weights, and show allowable loads. Jones & Laughlin Steel Corp.

Good Tips on Storage

105 Need More Storage Space?—The Space Wheel is a circular chart showing how you can save warehouse space. Shows aisle width required for right-angle stacking with all types of fork trucks; the area devoted to aisles in square feet; and the savings effected in cubic feet of storage space. Lewis-Shepard Products, Inc.

106 Crane for Storage Areas — How company's Trak-Rak cranes let you store more in less space by utilizing maximum area of the cube and using minimum aisle area is shown in Bulletin TRC-101, 20 pp. Photos show these cranes in use in bar stock storage, pipe and tube storage, small parts storage, container storage and many other applications. Includes engineering data on some typical systems. Chicago Tramrail Corp.

107 Improved Steel Shelving—A steel shelving designed for quick, easy installation, in which each unit is "a unit within itself" is introduced in this 12-pp bulletin. Component parts and simplicity of design are described and illustrated, as are optional accessories. Borroughs Mfg. Co.

108 Shelving Uprights—Bulletin 2748, 6 pp, describes, shows application, step-by-step assembly of manufacturer's standard steel shelving uprights. Shows how uprights can be used with new or used lumber. S. A. Hirsch Mfg. Co.

MATERIALS HANDLING

109 Power Conveyor Possibilities—How to plan materials handling around the flexible designs of this manufacturer's FMC Power conveyor is told in this 24-pp generously illustrated booklet. Describes and illustrates three belted power conveyor frame designs: channel frame, unitized formed rail frame and angle iron frame. A section of engineering data includes cutaway views of bearing details, roller construction, frame construction and tabulated specifications. Also shown are available types of intersections, diverters, box stops, 90-deg turns. Materials Handling Section, Food Machinery and Chemical Corp.

110 Conveyor Belting—Folder 54-3, contains a capsule description of construction, types of treated stitched canvas belting for all conveying and elevating applications. Describes company's general conveyor and elevator belt, oil- and acid-resisting, belts to handle hot materials to a maximum of 600 F. Imperial Belting Co.

111 Overhead Handling Equipment—Booklet 2008-K, 12 pp, is a newly revised edition of this company's engineering and application data booklet covering overhead materials handling equipment. Describes and illustrates track drives, cranes, electrification, buckets, grabs. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

112 Lift Truck Maintenance—Attractively illustrated in color, this 8-pp book examines the anatomy of electric fork trucks, using company's 4000-lb capacity truck as the specimen. Twenty pictures showing the most important components of fork trucks make this an ideal reference for plant engineers concerned with truck operation and maintenance. The Baker-Raulang Co.

113 Skip Hoists—Sixteen-pp Bulletin 110 provides sequence views of operation of weigh type and plug feed loading gates. Lists capacities of various size buckets, traveling various lifts at various speeds. Describes hoist engines, sheaves, head frames and counterweights. The C. O. Bartlett & Snow Co.

114 Trucks, Handling Equipment — More than 40 types of trucks, special trucks, tote boxes, dolly trucks, trays, baskets and receptacles—practically all made from hard vulcanized fiber—are shown in Catalog 54, a 24-pp fit-your-pocket booklet. Color illustrations accompany brief description giving uses, construction details and features. Fibre Specialty Div., National Vulcanized Fibre Co.

115 Electric Fork Trucks—"Electri-Facts," a 16-pp illustrated brochure, uses schematic drawings to explain construction features of manufacturer's fork truck line. Shows vital parts of integral drive unit; truck attachments ranging from overhead guards to snow plows. Clark Equipment Co.

116 Lightweight Platform Trucks—Bulletin MPT-151 describes company's complete line of all-magnesium four-wheel platform trucks. Gives specifications. Magline Inc.

117 Good Fork Truck Operation—"Proper Operator Judgment Cuts Cost of Fork Truck Operations" is a discussion of correct methods of operator training. Offers worthwhile reading to plant engineers concerned with efficient use of fork trucks. Mercury Mfg. Co.

118 Processing Carriers—This 12-pp bulletin illustrates specialized processing carriers for plating and heat treating. Includes wire baskets, other wire mesh products in various sizes, mesh and alloys; also fixtures, crates and tanks. Wiretex Mfg. Co., Inc.

MECHANICAL POWER TRANSMISSION

119 Improved FHP Drive—Catalog M-543, 24 pp and illustrated in color, describes the design of company's new FHP Vari-Speed Motodrive. Besides outlining operating features of the drive, booklet lists prices for all units, controls and modifications. Also discusses the "threaded" spiral groove lubrication utilized. Includes instructions on how to select proper unit. Reeves Pulley Co.

120 Sprockets, Roller Chains — Bulletin A-632 (a 4-pp supplement to Bulletin A-624), gives technical data, prices for company's entire Taper-Lock line of sprockets and chain for sizes from 40 through 160, pitch range from ½ through 2 in. Tables give dimensions, number of teeth, sprocket and bushing numbers, weights, bores, keyseats; also data on riveted and cottered roller chains, roller chain pin extractors. Dodge Mfg. Corp.

121 Linear Ball Bearings—Form 100A is a 12-pp catalog on this manufacturer's Ball Bushings, offered as a solution to problems of sliding linear motion. Low friction, design economies, elimination of binding and chatter, and other advantages—22 in all—are discussed. Shafting, sealing requirements and lubrication are treated and installation procedure given. Also provided are drawings showing mounting arrangements, and load capacity tables. Thomson Industries, Inc.

ELECTRICAL EQUIPMENT

122 Productive Maintenance — Bulletin GEA-6087, 18 pp, discusses five steps to productive maintenance: determining extent of routine maintenance, establishing a routine operating control system, evaluation for critical maintenance, and establishing a critical maintenance program. General Electric Co.

Reader Service Cards for ordering bulletins are on pages 157-158. Be sure to include your name, job title, and company.

123 Switches for Many Jobs—Catalog 101, 20 pp, covers 22 families of switches for a-c or d-c current, describes 258 different switches, actuators and enclosures. Includes dimensionalized photos, complete characteristics, electrical ratings, technical data to help the plant engineer pick the right switches for his particular applications. Micro Switch Div., Minneapolis-Honeywell Regulator Co.

124 Repetitive Manufacture Power Transformers—Bulletin GEA-6108, 40 pp, describes repetitive manufacture (built in accordance with ASA Standard C57.12a) power transformers. Cites application, features of standardized single- and three-phase units, from 501 to 10,000 kva. Includes price data, descriptions of optional features. General Electric Co.

125 Electrical Trouble Shooter—This 8-pp booklet describes the Brunt Faultfinder, an electrical maintenance instrument for locating grounds in normally undergrounded electrical circuits. Well illustrated, contains information on purpose and operation of several models available. Parr Mfg. Corp.

126 Aperiodic Coupling—Brochure E-108, 8 pp, on aperiodic coupling units, coupling capacitors and potential devices, describes company's improved equipment for wide band coupling of carrier current signals to high-voltage transmission lines. Includes circuits of the network high pass filter and potential device, insertion loss characteristics, dimensions. Motorola Communications & Electronics, Inc.

VALVES AND PIPING ACCESSORIES

128 Lubricated Plug Valves — Reference Book 39-5, 24 pp, shows lubricated plug valves in full-port and venturi types, sizes to 14 in., with a choice of self-sealed two-piece plug or one-piece plug design. Includes principal dimensions, types of control, metals, lubricants. Homestead Valve Mfg. Co.

129 Gages and Valves—Catalog 236, 8 pp, covers company's complete line of liquid level gages and valves with condensed presentation of data and specifications. Includes illustrations of standard, special function equipment, steam ratings of gages, dimensional drawings, features. Jerguson Gage & Valve Co.

130 For Lighter Pipe Loads—Bulletin 154 describes the Junior Counterpoise pipe hanger designed for a light load and long travel constant support. Tells applications in which this simple and compact hanger is particularly

suited, gives features of the unit. Includes dimensions. National Valve and Mfg. Co.

MAINTENANCE

131 Everything for Spray Painting—Catalog 956 is a well-organized ordering book on spray painting equipment. The 1100 products and accessories are classified in 11 sections for fast reference, and thumb indexed. A section on nozzle selection contains tables showing correct fluid and air nozzles, air requirement and needle for each of a wide range of fluids. Detailed information is also given on spray guns, extensions and attachments, pressure and suction cups, oil and water extractors, pressure fluid tanks, compressors, other equipment and accessories. The Binks Mfg. Co.

132 Plant Cleaning Guide — How-to-do-it charts based on in-plant maintenance procedure are featured in Bulletin F. 9394, a 12-pp pocket-size folder. Lists recommended cleaning materials, application methods, concentrations and temperatures for cleaning, treating water in air conditioning, refrigeration units. Describes company's cleaning materials, steam guns, hot spray unit. Oakite Products, Inc.

133 Building Maintenance Guide—This compact, 24-pp booklet is of special interest to plant engineers concerned with building maintenance and construction problems. Describes number of manufacturer's products; discusses maintenance problems of roofs, floors, sash, masonry preservation. More than 50 photos and drawings illustrate flashing and coping repair, installation of mastic flooring, caulking and pointing, glazing and painting. The Tremco Mfg. Co.

134 Data on Asphalt Mastics—This 12-pp article discusses composition and recommended applications of asphaltic mastic protective coatings. Provides an exhaustive description of the chemical and physical properties of mastics, and explanation of surface preparation of applying asphaltic mastics. Graphs show degree of chemical resistance exhibited by these mastics to 150 chemical substances. Emjay Maintenance Engineers.

135 Cold Galvanizing Process—Volume 452, 8 pp, describes Galvicon, which may be brushed or sprayed on iron and steel surfaces to protect against corrosion. Discusses advantages of this cold galvanizing process over other means of corrosion protection. Details use on pipe lines, other applications, and describes various methods of application. Chemical Div., Galvicon Corp.

136 Tank Lining—Plasticote, an insoluble cement lining to protect the inside of new and old hot water tanks and generators against corrosion and eliminate rusty water is described in this bulletin. Discusses application and gives advantages to be obtained by using plasticote. Metalweld, Inc.

MACHINE SHOP EQUIPMENT

140 Cut-Off Wheels — Valuable operating suggestions for improved and faster metal cutting, and photos showing the wheels installed on various types of machines are provided in Bulletin 6750. Includes recommendations with wheel grade numbers for a wide variety of materials. Manhattan Rubber Div., Raybestos-Manhattan, Inc.

141 Grinding Wheels—This comprehensive, plastic bound reference catalog contains more than 60 pp of data on all types of manufacturer's grinding wheels, Flex wheels and break resistant cut-off wheels. Fully indexed book gives proper operating speeds of all wheels listed. A feature is an illustrated section on accessories for use on small hand grinders. Booklet holds much useful information for plant engineers concerned with grinding wheels and portable tools. Please state your title when requesting this. Chicago Wheel & Mfg. Co.

142 For Grinding Nonferrous Metals—Bulletin A-AIF, 8 pp, illustrated, describes use of 3M coated abrasives for grinding, finishing nonferrous metals. Points out uses, advantages, of coated abrasive belts and disks for removing nibs, risers from castings. Describes grinding operations in nonferrous foundries; diagrams show most common types of machines using abrasives. Minnesota Mining & Mfg. Co.

143 Resinoid Grinding Wheels — Catalog 1748, 28 pp, describes a line of reinforced resinoid grinding wheels. Well illustrated, contains application photos, tables of wheel sizes, prices, operating speeds, other data. Scores of portable grinding operations are listed together with recommended wheel specifications. Straight wheels, hub wheels, and reinforced straight and hub wheels are discussed. Norton Co.

144 Hydraulic Sprocket Pullers—Bulletin SP-54 describes and pictures portable, hydraulic sprocket puller and installing sets in 50- and 100-ton capacities. Shows how these pullers are engineered to facilitate removing and installing drives on industrial crawler tractors. Owatonna Tool Co.

145 For Light-Duty Isolation—Bulletin 537 presents detailed technical and application information on vibration isolators for light industrial applications. Gives dimensions, load ratings, installation procedure, variation of natural frequency with load, and data on isolation efficiency. The Barry Corp.

146 All About Wiping Cloths—Now available is a chart rating 21 basic types of cloths according to wiping qualities. Gives information on absorbency, weight, softness, durability, lintlessness, weave, size and suggested uses. Covers cloths for general wiping, polishing, greasework, cleaning hands, etc., makes it easy to find the right one for the job. Charles Belsky & Sons, Inc.

Suggested Reading on Modern Welding Practice, Equipment

137 For Hard-to-Weld Metals—Catalog ADC 709B, 16 pp, explains features of company's Heliwelding (tungsten arc welding) process and the equipment used with it. Describes, shows in operation, manual holders, machine holders for use with semi-automatic equipment, others. Shows automatic, hardfacing process using vibratory feeder, accessory equipment including control panel. Air Reduction Sales Co.

138 Welding Electrodes—Announced as one of the most complete manuals available on stainless steel welding electrodes, 24-pp Bulletin WE-166 covers in detail the metallurgy of stainless steels. Provides selector tables, other tabular material on welding processes. Describes each of company's welding electrodes as to typical mechanical properties, chemical analysis range of deposited metal, recommended ranges. Welding Products Div., A. O. Smith Corp.

139 Welding Positioners — Fully illustrated, 16-pp Bulletin P1-2 outlines important features and gives condensed specifications on four welding positioners with capacities to 35,000 lb. An efficiency graph based on typical welding jobs provides a quick picture of production advantage. Welding Div., Harnischfeger Corp.

147 Manual on Welding Aluminum—Latest developments on all practical methods for welding aluminum are covered in this generously illustrated 176-pp booklet. Treats torch, arc, resistance and pressure welding, giving special attention to selection of methods, performance of welds, welding of castings and control of welding quality. A final section contains 32 comprehensive tables giving important data on welding aluminum. Tables cover physical properties of company's alloys, alloy compositions and strengths of welds. Booklet is available to qualified plant engineers, please give your job title when requesting it. Aluminum Co. of America.

148 How to Weld High Alloy Castings —Detailed information on welding of corrosion and heat resistant alloys is presented in three articles, 16 pp in all, each of which covers the welding of a different group of cast high alloys; straight chromium corrosion-resistant types are discussed in one article; chromium-nickel corrosion-resistant alloys in another; and heat-resistant alloys, in the third. Data on pre-weld and post-weld treatments are given. For arc welding of corrosion, and heat resistant grades, electrical settings, electrode sizes recommended. Alloy Casting Institute.

On pages 157-158 are two postage-free Reader Service Cards provided for your convenience in ordering these bulletins. You may also use the cards to order any literature mentioned in ads.

PUMPS, PUMPING

149 Plunger Pumps—Illustrated with photos, charts and drawings, Bulletin W-414-B45, 12 pp, describes three types of company's vertical triplex, single action plunger pumps, with 2- to 6-in. stroke. Discusses features, applications, ratings, dimensions. Worthington Corp.

150 Controlled Volume Pumps—Technical Paper 63, 8 pp, discusses installation and maintenance of controlled volume pumps. Describes correct procedure for connection of suction and discharge piping, flushing connections, breaking in packing. Trouble shooting chart lists most common difficulties encountered, describes symptoms, causes, remedies. Milton Roy Co.

151 Heavy-Duty Centrifugal Pumps—Bulletin W-341-B11B, 8 pp, describes saddle-mounted, vertically-split centrifugal pumps designed for continuous duty in all boiler circulation and heater drain services. Discusses construction materials, coverages available, pressure-temperature limitations, dimensions, specifications. Worthington Corp.

WATER TREATING

152 Boiler Blowdown Control — Technical Paper No. 128, 10 pp, discusses principal types of boiler blowdown, also various control methods for producing pure steam and keeping heat transfer surfaces free of scale, other deposits. Tables give calculations for potential savings when using heat recovery equipment with continuous blowdown systems, and reduction in blowdown percentage. W. H. & L. D. Betz.

153 Industrial Water Service — How this company is prepared to solve problems related to procurement, treatment, use and disposal of industrial water is told in this 10-pp booklet. Tells services and facilities available; discusses measures taken to solve some representative water problems. Hall Laboratories, Inc.

154 Water Conditioning Data Book—A new edition of this company's popular reference volume, Data Book 2478A, contains 108 pp and presents a compilation of 78 chapters and tables. Subjects covered include hydraulics; impurities in water; chemical conversions; coagulant, acid and alkali dosages; chemicals used in water treatment; water treatment processes; boiler feed make-up requirements; alkalinity relationships; specific gravities; chemical reactions. This handy-sized, leatherette bound booklet is available to qualified plant engineers. Please state your job title when requesting it. The Permutit Co.

155 For Water Treating Accuracy—Of interest to plant engineers concerned with water treatment and waste treatment is 8-pp Bulletin 5421 on measurement and control of liquids by a pneumatic operated control system. Illustrates the system, describes basic elements and details its functions. Includes dimensional data. General Filter Co.

INSTRUMENTS, CONTROLS

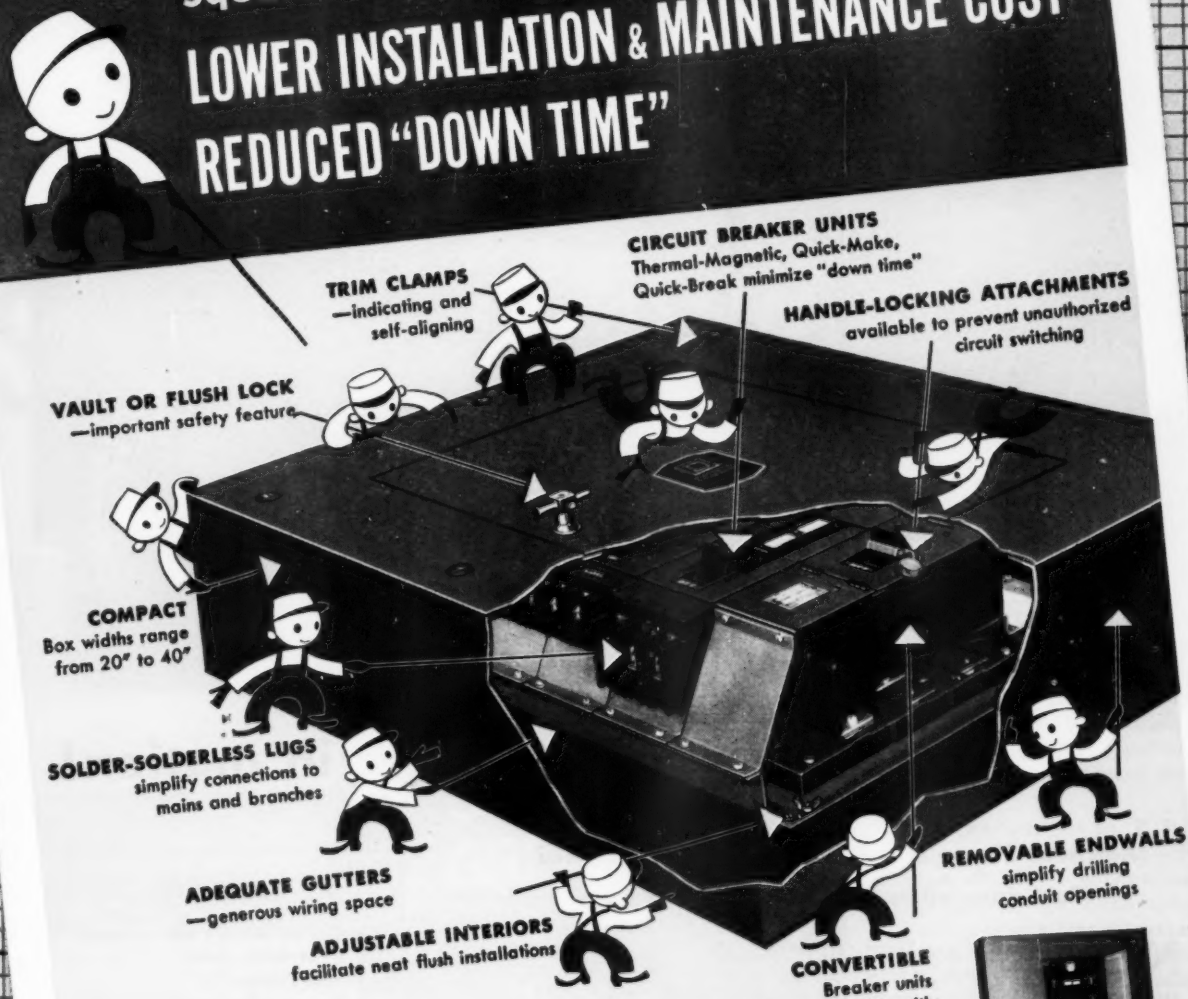
156 Process Timer — Bulletin GEC-1223, 8 pp, describes operation, advantages, applications of company's new process timer, in single- and two-circuit model. Includes connection diagrams for typical applications, installation and cutaway illustrations, prices, specifications, dimensions. General Electric Co.

157 Control Panels — Bulletin 254 covers control panels for use with weighing and mate-

(More Bulletins on page 157)

Square D ML Panelboards give you . . .

LOWER INSTALLATION & MAINTENANCE COST
REDUCED "DOWN TIME"



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provide complete, 2-way protection through the use of thermal-magnetic breaker units. Costly "down time" is held to a minimum since circuit breakers can be reset quickly after the fault has been cleared.

Four circuit breaker frame sizes provide ratings ranging from 15 to 600 amperes, 250 or 600 volts.

Type MLN Type ML

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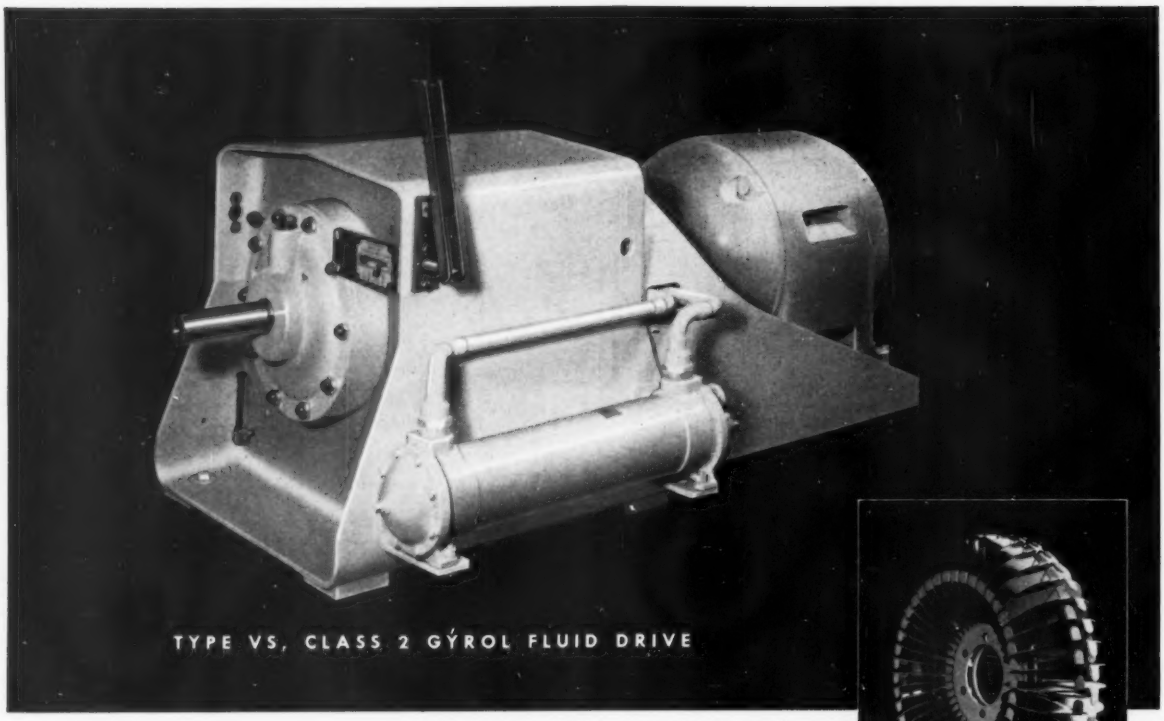

Phantom view of driving and driven members.→

New *Gýrol* Fluid Drive is reversible while in motion!

American Blower's new, class 2, adjustable-speed fluid drive offers unlimited application possibilities!

NEWEST member of the American Blower Gýrol Fluid Drive line, this versatile unit can be reversed while in motion—at any variable operating speed—by merely reversing the direction of rotation of the motor!

You'll find many other big advantages in this compact, self-contained unit for shockless, adjustable-speed control of fans, blowers, centrifugal pumps and compressors—and a wide variety of other industrial uses! Check the features of this new Gýrol Fluid Drive and see if it can be used in your own plant. It's a safe bet you will find several money-saving applications!

Get complete information about the American Blower Class 2, Adjustable-Speed Gýrol Fluid Drive from your nearest American Blower Branch Office. Or write us direct, Dept. 180-7, for your free copy of Bulletins 9419 and 9519. Do it, today!

FEATURES

- Can be reversed while in motion by reversing motor
- Speed range 5-1
- Across-the-line starting on many applications
- Motor can reach full speed before engaging load
- A compact, self-contained unit
- Trigger-action response—adjustable speed
- Speed may be controlled manually or automatically
- Six sizes, 7½ thru 800 hp—speeds up to 1800 rpm

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YOUR BEST BUY AMERICAN BLOWER GÝROL FLUID DRIVES

Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

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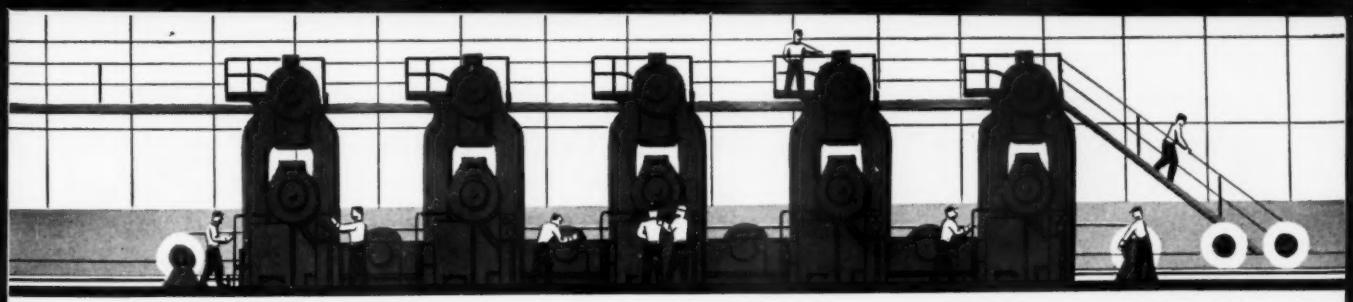


Now! cut application costs and grease inventories with

NEW STANOLITH GREASE MP

You need only this *one* grease for many kinds of heavy equipment!

Added high-load carrying capacity!

Resists both water and high temperatures!

Here is a newly formulated grease with such an increase in multi-purpose range that it helps you *cut application costs* and *reduce grease inventories.* Higher oil viscosity and greater extreme pressure properties make it suited for wide use in steel mills, cement mills, rubber mills, mining operations—all other heavy equipment industries.

More than just an "E. P." grease, New STANOLITH MP has all of the outstanding properties of STANOLITH greases: excellent oxidation stability and good mechanical stability. It has extreme water resistance and withstands high temperatures—*it will not thin out.* For better protection of all kinds of heavy equipment, under a wide range of conditions, use STANOLITH Grease MP.

New STANOLITH Grease MP takes its place with famous STANOLITH Greases No. 42 and No. 57 to give you the most versatile collection of multi-purpose greases in modern industry.

STANDARD OIL COMPANY *(Indiana)*

Call your nearby Standard Oil lubrication specialist and let him show you how Standard's "multi-purpose" greases can save you money and help you avoid trouble.

STANDARD

For more facts circle 524 on Reply Card

"LUBRIPLATE, THE OUNCE OF PREVENTION"

says
VULCAN IRON WORKS, INC.
of Chicago, Ill.

—a leading manufacturer of pile driving and extracting equipment

"For many years we have used LUBRIPLATE Lubricants for shop assembly, and have recommended them to our customers through your LUBRIPLATE Tag Plan. Our experience shows that if the proper lubricants are used from the beginning, there are fewer problems and parts replacements later. We consider LUBRIPLATE to be the best possible ounce of prevention."—
H. G. Warrington, Vice-Pres.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

For more facts circle 525 on Reply Card

BACKTALK about our past issues

Edited by R. L. Marinello

To Reprint Pipe Sizing Charts

PLANT ENGINEERING:

"Recently you were kind enough to send to the attention of the undersigned three reprints of an article entitled 'Quick and Accurate Pipe Sizing Charts,' published in the October, 1953 issue of PLANT ENGINEERING.

"Now, we would like to reproduce the charts by the multigraph process for distribution to our agents, and perhaps to some of our steam trap customers. Could we obtain permission for this reproduction from your magazine?" *H. L. Johnson, Chief Engineer, W. H. Nicholson & Co., Wilkes-Barre, Pa.*

► PLANT ENGINEERING is pleased to give you permission to reproduce the pipe sizing charts.—*Editors.*

Availability of X-RAY Unit

PLANT ENGINEERING:

"Can you furnish any additional information regarding the thulium X-ray as described in the June, 1954, issue of PLANT ENGINEERING?

"I am interested in knowing whether the unit is available for purchase and its total cost including irradiation charges.

"I shall appreciate any information made available." *P. W. Ghaner, Product Engineering, Sylvania Electric Products, Inc., Altoona, Pennsylvania.*

► More information on this equipment may be obtained from Mr. L. C. Furney, Argonne National Laboratories, P. O. Box 299, Lemont, Illinois.—*Editors.*

Dome Light Data

PLANT ENGINEERING:

"In our review of the April, 1954 issue of your magazine, we read about the dome light article on page 118 which flashes intermittently during the time of crane repairs.

"We are interested in additional information on this light with regard to the make, type of light and voltage.

"We will appreciate your forwarding this information at your earliest convenience." *R. H. Carr, General Supervisor, Safety, United States Steel Corp., Braddock, Pennsylvania.*

► We are forwarding your letter to Mr. Foster C. Koehn, Director of Plant Engineering, The Falk Corp.—*Editors.*

Construction Details

PLANT ENGINEERING:

"In the June, 1954, issue of PLANT ENGINEERING you have an article on page 96 entitled 'Plant Built in a Jiffy with "Sandwich" Construction.' We would appreciate receiving as much information as possible about the details of construction used in this building." *W. B. Rhodes, Assistant Chief, Construction and Maintenance Department, American Brake Shoe Co., Mahwah, New Jersey.*

► Additional information about this type of construction may be obtained from John C. McComb, Aluminum Company of America, 1501 Alcoa Building, Pittsburgh 19, Pa.—*Editors.*

Blue Chip Inquiries

PLANT ENGINEERING:

"I can't recall a more outstanding job, by any trade publication, than the one you folks at PLANT ENGINEERING recently did with your article on ZRC.

"If any further testimony is needed as to the excellent technical quality of the writing, it can surely be found in the results you have produced for our client, The Sealube Co. The results almost verge on the fantastic, and not just for volume.

"Actually, the inquiries produced read like a listing of top, blue-chip concerns. And in many of these, the inquiry came from top management personnel.

"Thanks again for an excellent job. Keep up the fine work." *Michael Kraft, Vice-President, Packard & Kraft, Inc. Worcester, Massachusetts.*

A Vote for Moly Lubricant

PLANT ENGINEERING:

"We have read with interest the article 'Is It True What They Say About MOLY,' appearing on page 87 of the May issue of PLANT ENGINEERING. In order to acquaint our service engineers with this paper we should like very much to get fifteen reprints or tear sheets. If you could arrange for us to receive these fifteen copies, we should be grateful." *D. G. Weaver, Supervisor Publicity and Advertising Acheson Colloids Co., Port Huron, Michigan.*

► Extra tear sheets of this article are being sent to you with the compliments of the editorial department.—*Editors.*

Cooling Tower Article

PLANT ENGINEERING:

"This office is anxious to obtain for official use in our Mechanical Section six copies of the article which appears on page 124 of the May, 1954, issue.

"This article is 'How to Use Test Data to Calculate Cooling Tower Performance,' by F. B. Reed and L. T. Mart, of the Marley Co.

"Anything you can do to supply us with these reprints will be greatly appreciated." *M. L. Granger, Research Analyst, Technical Library, Engineering*

BETZ • *A Great Name*
In Water Conditioning

we're from Missouri...

. . . and for good reason!

Betz Water Conditioning Service is based on the policy that nothing is left to chance. There are no mere guesses or assumptions that conditions are satisfactory at a client's plant.

In addition to regular visits by Betz Engineers and daily water testing by plant personnel, we "double-check" results by means of more complete analyses in our own laboratories.

At regular intervals, water samples from important points throughout the plant system are secured by our engineers and forwarded to our modern laboratories. Here, experienced chemists analyze each sample until it literally breaks down and "admits the facts".

Such painstaking analyses often reveal conditions which may not be evident from plant control tests. It permits our Engineering Division to make corrective recommendations *well in advance*, thereby heading off any serious trouble which might develop. This, too, is *another* important part of Betz *completely-integrated* water conditioning service.

W. H. & L. D. BETZ, Gillingham & Worth Streets, Philadelphia 24, Pa.

In Canada: BETZ Laboratories Limited, Montreal 1.

BETZ

CONSULTANTS ON INDUSTRIAL WATER PROBLEMS

For more facts circle 526 on Reply Card

SAFETY
MAINTENANCE
LESS WORK
INTERRUPTION

Baker Adjustable Steel Scaffolds permit the placement of workmen at the correct distance from their work . . . no *unsafe reaching*. The fully adjustable platform height provides adjustment every 3 inches. Platform support trusses lock to upright ladder sections with both automatic and manual safety locks, making sure that they cannot be rocked or sprung loose. The platform is always level, even on uneven floor surfaces or stairways.

Baker Scaffolds come complete with metal-bound platform . . . large area enables more than one man to work on the same scaffold. They provide fast erection and dismantling and have no bolts, nuts or loose parts to cause needless delays.

Locking casters lock both the wheels and the swivel for greater safety.

The absence of "X" bracing permits the use of Baker Scaffolds in occupied areas with a minimum of disturbance . . . they span machinery, equipment and stockpiles.

Listed under Reexamination Service, Underwriters Laboratories, Inc.

Distributors in principal cities.

Write for Bulletin 542

Manufactured by:

BAKER-ROOS, INC.

602 W. McCARTY STREET • INDIANAPOLIS, IND.

BAKER-ROOS, INC.
P.O. Box 542, Indianapolis, Indiana.

Gentlemen:

Please send me free information on Baker Scaffolds.

NAME_____

COMPANY_____

CITY_____ STATE_____

For more facts circle 527 on Reply Card

BACKTALK

Division, Corps. of Engineers, U. S. Army, Savannah District, Savannah, Ga.

► We are happy to make six sets of tear sheets of this article available to you for use in the Mechanical Section of your library.—*Editors.*

Seeks Info on Maintenance Talk

PLANT ENGINEERING:

"We would appreciate a copy or tear sheet of the talk by George J. Martin, Manager of the Mechanical Division of the National Biscuit Co., on 'Planned Preventive Maintenance,' given at the recent manufacturing conference of the American Management Association. This was mentioned in the 'Round About section of the June issue." *J. A. Regan, Purchasing Agent, Joy Manufacturing Co., Claremont, New Hampshire.*

► We merely have a brief resume of his paper but are happy to send this to you for what it is worth. If you still would like to have the complete paper, we would suggest that you write to the American Management Association, 330 West 42nd St., N. Y. 36, N. Y.—*Editors.*

With Our Compliments

PLANT ENGINEERING:

"We read with interest the article 'Power Factor Can Be Measured by Ammeter,' by C. Spain, Jr., of Westinghouse Co., appearing in the May, 1954 issue of PLANT ENGINEERING.

"If it is possible, we would like to have a reprint copy of this article for our file." *N. Arsenault, Canadian Industries Ltd., Shawinigan Falls, Quebec.*

Hacksaw to Cut 90 lb Rail

PLANT ENGINEERING:

"Observing the article on page 115 of the May issue, relative to the Hand-I-Hack saw, we would like information as to whether the manufacturer has a gasoline powered portable hacksaw that would be suitable for cutting 90 pound railroad rail.

"In any event, we would like information and price of the machine discussed, in duplicate." *N. E. Guyer, Purchasing Agent, Kennecott Copper Corp., Hayden, Arizona.*

► Your inquiry is being forwarded to the manufacturer, Lipe-Rollway Corp., Emerson Avenue, Syracuse, New York, to the attention of Roy C. Brett, Advertising and Promotion Manager.—*Editors.*

Six Prints on the Way

PLANT ENGINEERING:

"We are interested in obtaining six reprints of the article appearing in the June issue of PLANT ENGINEERING entitled 'Guide to the Use of Mastic Coatings,' on pages 100 and 101.

"If these prints are available, will you please ship to the following address: Kimberly-Clark Corp., Service Operations Department, Memphis, Tennessee." *L. C. Stilp, General Purchasing Agent, Kimberly-Clark Corp., Neenah, Wis.*

NEMA Article—Best He's Seen

PLANT ENGINEERING:

"I have read your article entitled 'New NEMA Standard Motors—How Interchangeable?' in the April, 1954, issue. Naturally, this problem is of vital interest to us.

"This is one of the best articles which I have seen on the NEMA re-rating program. If it is not contrary to your editorial policy, would you give us permission to reprint the article and distribute it, giving proper credit to PLANT ENGINEERING.

"I hope that we will be able to use this very excellent article." *A. L. Baker, Advertising and Sales Promotion, Medium Induction Motor Department, General Electric Co., Schenectady, N. Y.*

► We are pleased to hear that you liked the article and are happy to give you permission to reprint it.—*Editors.*

To Reprint in House Organ

PLANT ENGINEERING:

"We would like to have your permission to reprint the article 'Compressed Air Survey Knocks Wind Out of Losses' which appeared on page 92 of the February 1954 issue of PLANT ENGINEERING. We would like to reprint this article with the illustration as shown in our house organ the *Ratonews.*

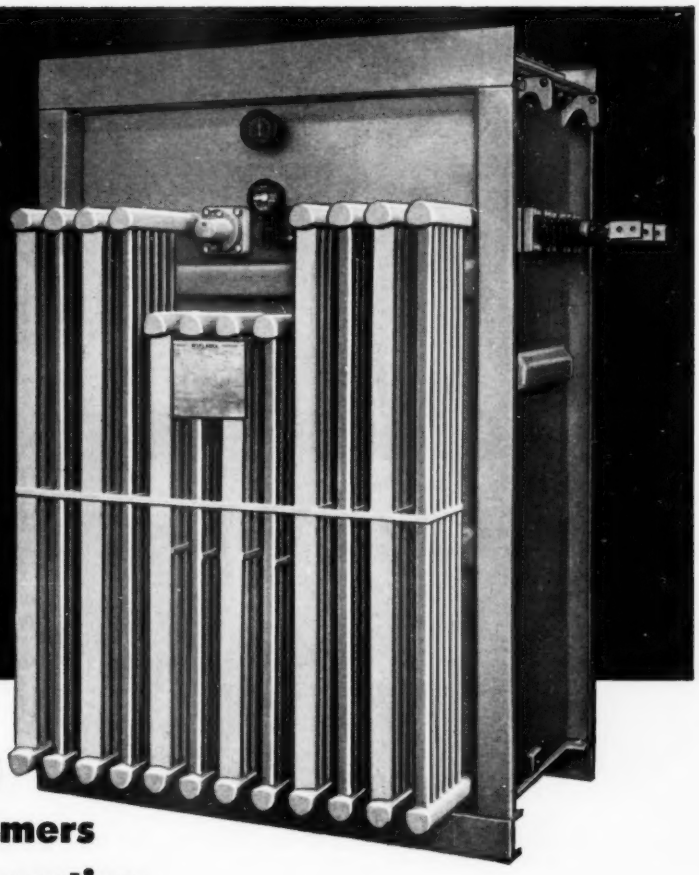
"If possible, could you please furnish us with glossy prints of the eight illustrations shown in the article. If only original artwork is available, we will be glad to make photographs and return the originals to you.

Naturally, we will credit PLANT ENGINEERING with the original article. Your kind cooperation in this matter will be deeply appreciated." *Warren H. Lauder, Supervisor, Technical Publicity, Fischer & Porter Co., Hatboro, Pennsylvania.*

► You are most welcome to reprint this article in your company house organ. We would appreciate your returning the illustrations after they have served your purpose.—*Editors.*

Wagner®
TRANSFORMERS
...the choice of leaders in industry

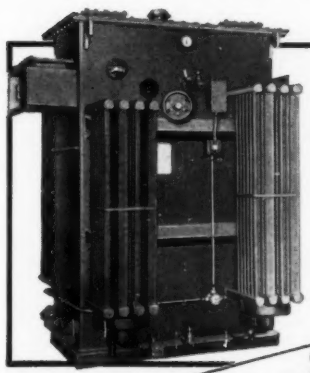
first step to building a compact, modern Unit Substation



THE NEW

Wagner Liquid-Filled Load Center Transformers designed for flush mounting

Now, Wagner Noflamol (non-inflammable liquid-filled) Load Center Transformers are available in a new, improved close-coupled design, as well as in the standard throat-connected design. These transformers can be flush-mounted with any make of switchgear to form a neat, compact, streamlined unit substation for modern industrial service.



Wagner
Throat-Connected Unit Substation Transformers

For outdoor installation, or for applications where it is desirable to locate the transformer away from the switchgear, Wagner can furnish these liquid-filled transformers in ratings to 2000 kva, 15 kv and below. Bulletin TU-13 gives full information.

Wagner close-coupled transformers are available in ratings from 500 through 2000 kva. They are carefully designed to meet your distribution requirements.

Look to Wagner for better transformers that assure a continuous, dependable flow of power. Your nearby Wagner engineer will be glad to help you solve your load-center problems. Call the nearest of our 32 branch offices, or write us.

Wagner Electric Corporation
EST. 1891

WAGNER ELECTRIC CORPORATION
6492 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

T54-11

For more facts circle 534 on Reply Card

Notice the **CONCAVE SIDES** of **Gates V-Belts!**

(U.S. PATENT NO. 1813698)

--that's why they last longer!

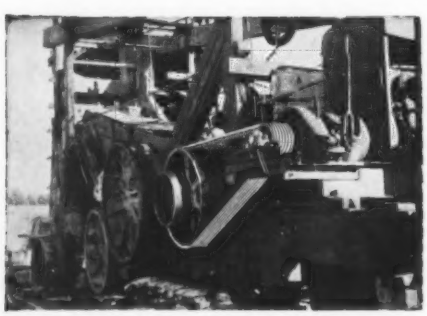
Just try this yourself. Bend any *straight-sided* V-belt (Fig. 1) as it bends in going around its pulley. At the same time, grip its sides with your fingers and *feel* those sides *bulge out!* (Fig. 1-A)

Clearly, those bulging sides are forced to press *unevenly* against the V-pulley—and this causes extra wear at the points shown by arrows (Fig. 1-A).

Now bend the Belt with CONCAVE SIDES . . . . . the GATES VULCO ROPE (Fig. 2)

You will feel the precisely engineered CONCAVE SIDES *fill out* to an *exact fit* in the sheave groove (Fig. 2-A). These sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the full width of the GATES VULCO ROPE—and this means *longer* belt life and *lower* belt costs for you.

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES—the GATES VULCO ROPE!



Typical Gates Vulco Rope Drive—the Gates V-Belts are built with Concave Sides to insure longer belt wear.

VULCO ROPE **DRIVES**

THE GATES RUBBER COMPANY
DENVER, U.S.A.

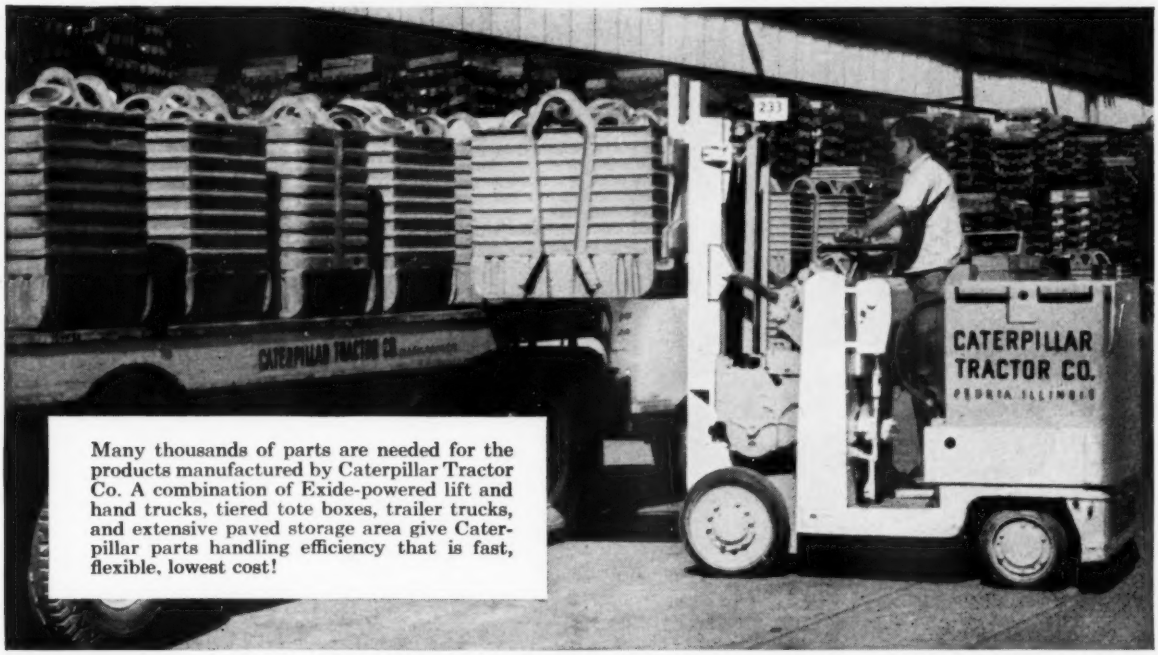
Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

CS•547

For more facts circle 529 on Reply Card

GET FAST, SAFE HANDLING THROUGHOUT EACH SHIFT

. . . with low cost Exide-Ironclad battery power!



Many thousands of parts are needed for the products manufactured by Caterpillar Tractor Co. A combination of Exide-powered lift and hand trucks, tiered tote boxes, trailer trucks, and extensive paved storage area give Caterpillar parts handling efficiency that is fast, flexible, lowest cost!

YOU GET split-second handling, uniform performance throughout each shift when electric trucks are powered by dependable Exide-Ironclads. Whether the load is light or heavy, Exide-Ironclads deliver power instantly, insuring smooth, rapid handling of materials. Your trucks handle as much pay load during the last hour as during the first . . . with no unscheduled down time. Lower costs for operation, maintenance and depreciation make Exide-Ironclads your best power buy—AT ANY PRICE!

THE POSITIVE PLATES are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing *greater power*. Also, more active material is retained, *giving longer working life.*

THE NEW THRIFTY HAULER! The improved industrial truck battery. *Non-oxidizing* plastic power tubes assure longest battery life, more capacity in the same space. For full details, call your Exide sales engineer—write for Form 1982 (Installation and Maintenance of Motive Power).

Your best power buy
. . . AT ANY PRICE!

Exide®
IRONCLAD® BATTERIES

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

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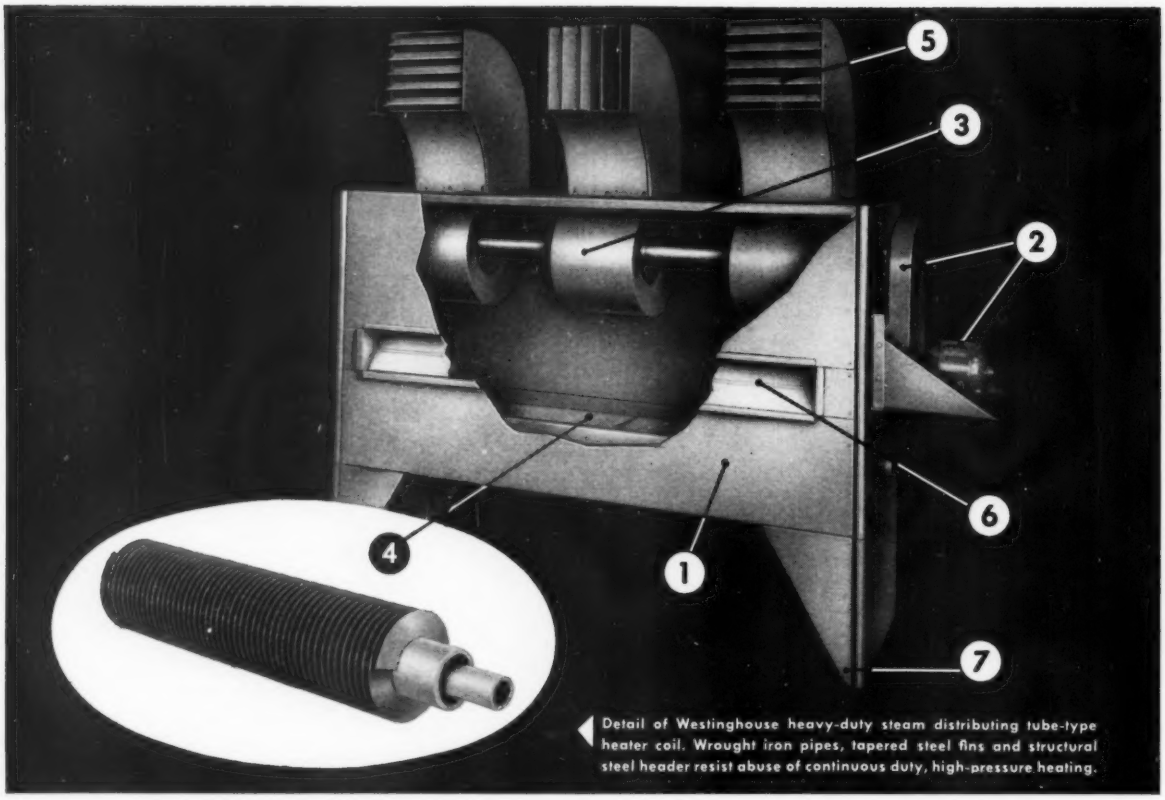


Detail of Westinghouse heavy-duty steam distributing tube-type heater coil. Wrought iron pipes, tapered steel fins and structural steel header resist abuse of continuous duty, high-pressure heating.

Rugged, Quiet Westinghouse Industrial Heaters... Designed For Continuous Heavy-Duty Systems!

Seven Features Assure Dependable, Versatile Coverage of Large Areas

Westinghouse Industrial Heaters supply ideal heat under difficult conditions. In plant, warehouse, garage and similar buildings, these heaters efficiently blanket large work zones, even those with high ceilings, frequently opened doors and expansive window areas. They also supply make-up air for exhaust systems . . . may be used to circulate ventilating air during warm seasons. Capacities in six sizes range up to 2,500,000 BTU/hr . . . 25,000 cfm . . . 200 psig steam pressure.

Each Westinghouse Industrial Heater is a complete unit. That's why each can be placed where it will do the most good . . . whether on floor, or wall (upright or inverted), or suspended from ceiling. Economically selected and scientifically grouped, Westinghouse Industrial Heaters satisfy the needs of areas of any size or shape, and can be readily relocated to suit plant layout changes.

Westinghouse Industrial Heaters have a line-up of features that is unique:

1. Casings are rugged heavy-gauge steel. Front and back panels are easily removed.
2. Standard motors have adjustable V-belt drive on units with motors up to 5 HP.
3. Powerful, yet quiet, fans are multiblade centrifugal type mounted on a common shaft. Blades are forwardly curved.
4. Efficient steam coils are heavy-duty or general purpose. Former are wrought iron for extra-long life (see detail shown above); latter are standard or steam distributing copper-tube type.
5. Discharge outlets and deflectors permit flexible discharge arrangements. Result: most advantageous airflow and heat distribution pattern.
6. Bypass damper arrangement permits constant air modulation. Standard arrangement permits steam modulation.
7. Rounded corners, smooth surfaces eliminate accidents, minimize dirt.

These features are backed up with a Westinghouse-Sturtevant exclusive—a single equipment warranty with undivided responsibility. This unit responsibility is your greatest guarantee of dependable performance for years to come. For complete details call on the Westinghouse-Sturtevant air handling specialist conveniently located in your area. Or write: Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.

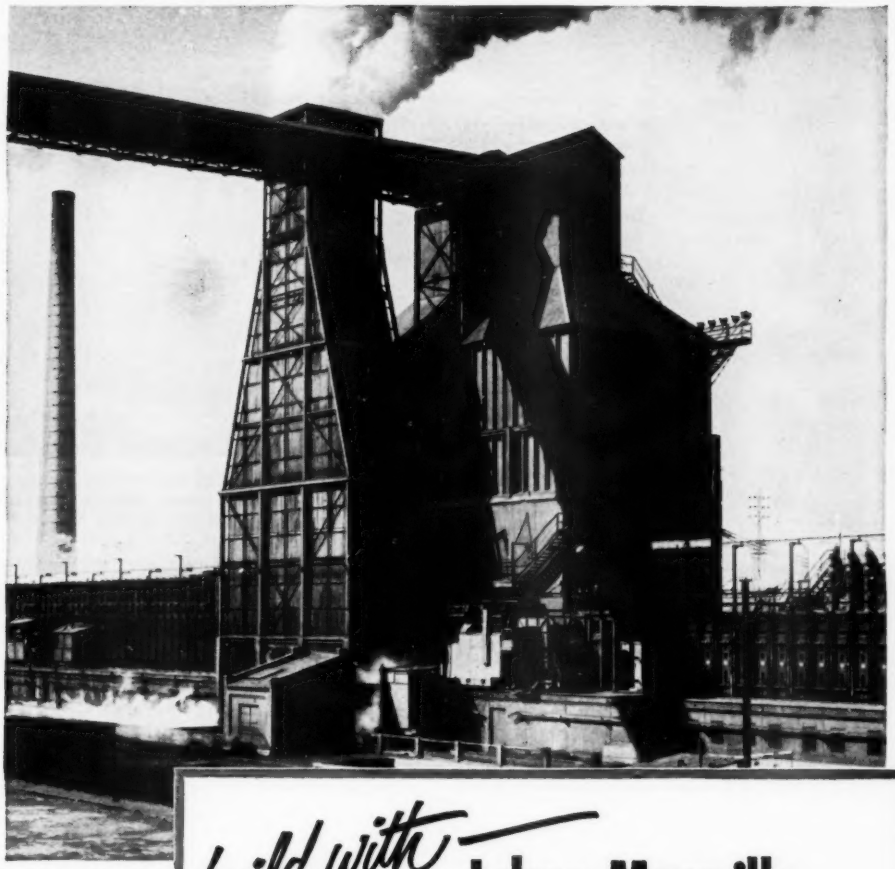
WESTINGHOUSE AIR HANDLING

YOU CAN BE SURE...IF IT'S Westinghouse

J-80412

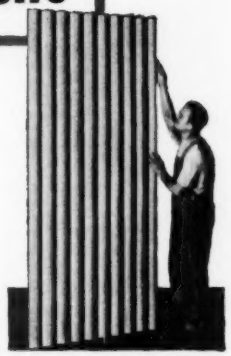
For more facts circle 531 on Reply Card

No costly maintenance problem here



So severe are the steam and fume conditions in this coke quencher station, that the heavy structural steel framing is on the *outside*, protected by J-M Corrugated Transite

build with **Johns-Manville Corrugated Asbestos Transite**



- Large sheets go up quickly
- Easy to fasten to steel
- Easy to nail to wood
- Easy to saw
- Easy to drill

For permanent, maintenance-free construction, plus protection from fire, rot and weather

YOU SAVE MONEY on construction and maintenance when you build with J-M Corrugated Transite®. Corrugated Transite comes in large sheets that require a minimum of framing . . . permit fast economical construction of maintenance-free industrial, commercial, institutional and agricultural buildings.

Made of asbestos and cement, Corrugated Transite is practically indestructible. It never needs paint or special treatment to preserve it . . . it's fireproof, rotproof and weatherproof. Corrugated Transite is also used increasingly for smart interiors . . . the streamlined corrugations and attractive shadow lines that give it such unusual architectural appeal for exteriors offer unlimited interior design possibilities.

Investigate Johns-Manville Corrugated Asbestos Transite and learn how you can build quickly and easily . . . have an attractive, long-lasting, trouble-free structure regardless of size or purpose. For complete details write Johns-Manville, Box 158, Dept. PE, New York 16, New York. In Canada write 199 Bay St., Toronto, Ontario.

JOHNS MANVILLE JM PRODUCTS **Johns-Manville**

For more facts circle 532 on Reply Card

PLANT ENGINEERS' DIGEST so those who rush may read and know what's new

Edited by M. E. Weissman

Hazards of Low Voltage Current

LOW VOLTAGE ELECTRIC CURRENT, like high voltage current, is dangerous when handled unsafely, since it is the amperage, rather than the voltage, that is the critical factor that does the damage.

Deaths have been recorded due to shock from a circuit carrying less than 50 v. Such a circuit may have an amperage ranging from less than 0.1, sufficient to kill, to considerably greater values. Therefore no voltage can be considered free from danger.

Shock occurs when an electric current flows through the body, the amount of shock received being in some measure affected by how good the contact is.

Chief body protection against low voltage electric current flow is the resistance offered by the skin. This resistance varies according to conditions. A person with a dry skin can have a resistance value of 100,000 to 600,000 ohms, while a person with a wet skin will have a resistance of only 1,000 ohms.

In general, locations or conditions which make low voltages particularly hazardous are: (1) high temperatures, causing perspiration; (2) wet or damp locations; and (3) locations where a person is in contact with grounded surfaces such as metal, wet concrete, etc.

When attempting to free a person from an electrical circuit, first disconnect the circuit if possible and if it can be done quickly. Insulate yourself by wrapping several thicknesses of dry cloth or newspaper around the hands, or push the person off the circuit with a dry board or wooden pole. Never touch the victim with your bare hands.

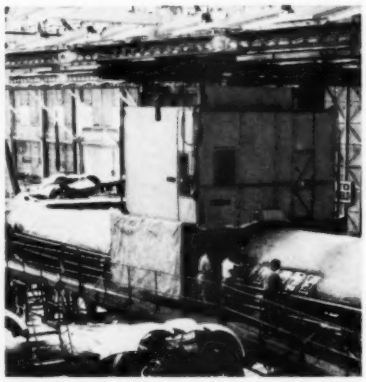
When working with electricity, everyone should protect himself so that current can not pass through the body in the event of a fault occurring in the circuit.

Switches, cords and connections of electrical tools and appliances shou'd be checked frequently, and necessary repairs made by an electrician. *From The Westerner, published by Olin Industries, Inc., East Alton, Illinois.*

Howdah Goes Industrial

BORROWING AN IDEA from Indian potentates, production engineers at Lockheed have designed their own version of a howdah, or elephant saddle.

The new style howdah carries a crew of painters and spray gun equipment back and forth along the 113-ft long fuselages of Super Constellation airplanes. In this way the exterior painting of an airplane can progress simultaneously with other final assembly operations. Time saving is five days for each plane.



Howdah-style paint booth suspended over plane fuselage carries crew and equipment, cutting the processing time

The paint booth measures 20 ft high, 13 ft wide, and 13 ft long. It is suspended from an overhead crane and straddles the fuselage of the plane. Painters stand on protected sidestands or scaffolds beneath the howdah's hood.

A specially designed exhaust system is used to eliminate potential fire hazards by automatically sucking up all paint residue and fumes through a vent in the roof.

Another safety device is an automatic fire extinguishing system. If the temperature in the howdah should reach 160 F, a thermostatically controlled siren sounds. Ten seconds later carbon dioxide type fire extinguishers under the hood automatically go into action. Emergency rope and ladders speed the crew's exit.

Use of the howdah makes it unnecessary to take a plane off the final assembly line for removal to a paint line and then to return it to the assembly line. *From a release of Lockheed Aircraft Corp., Burbank, Calif.*

Transparent Saw Guard Adds to Safety and Accuracy

Transparent plastic electric saw guard allows Howard Scott to watch the progress of his work, and at the same time, enables him to feed the work into the machine without running risk of injury to his hands. (From 3M Megaphone, published by Minnesota Mining and Manufacturing Company, St. Paul, Minnesota)

Economy in Lead Lining Tanks

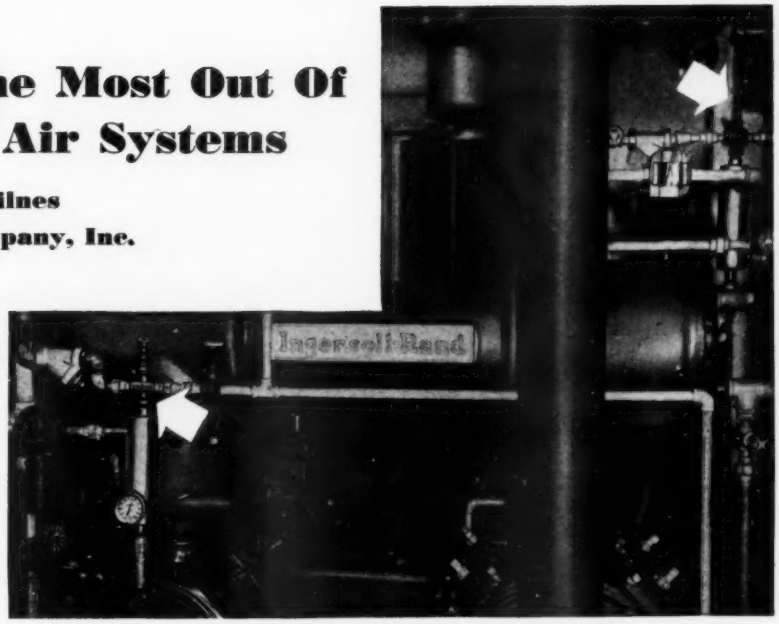
COST SAVINGS of 60 per cent have been made in the application of various types of lead lining with the use of a stud driver employing hardened steel studs, instead of more usual methods.

In chemical construction where lead

How To Get The Most Out Of Compressed Air Systems

A. Milnes

Sarco Company, Inc.



The replacement of hand controls by Sarco automatic cooling controls on this 2-stage Ingersoll-Rand compressor resulted in better lubrication, less condensate in air, and a considerable saving in cooling water.

THE practical place to measure the capacity of your compressed air system is where it counts the most—at your compressed air tools. From the time air is first drawn into the cylinder, many things can happen which will effectively reduce air pressure and limit compressor capacity. Following is a concise explanation of the major causes of reduced compressor capacity and the steps which can be taken to remedy them.

PROPER AIR INTAKE

Your compressor system can be fouled up before a pound of air has been compressed if the air intake has been improperly located. The air intake should be located where the atmosphere is clean, cool, free from corrosive chemical fumes, and dry to minimize condensation in the system.

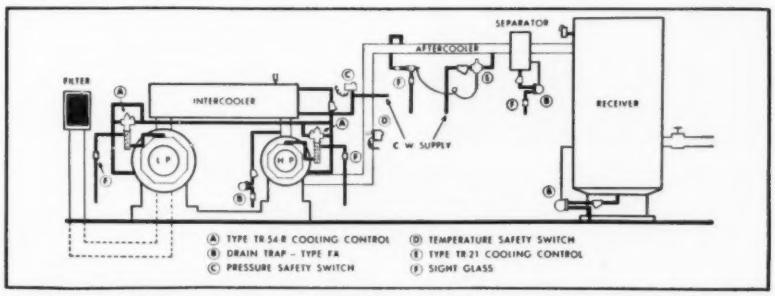
INTAKE PIPE DESIGN

A compressor can only operate at rated capacity if its air supply is unimpeded. Twisting, undersized pipes and dirty filters can effectively reduce air pressure at the compressor inlet. For example, a pressure loss of 2 psi due to friction in the intake pipe and filter will reduce the output of a 125 psi compressor by 7.5%. Check intake pipes and make sure they are short, of adequate size, and free of sharp bends.

AUTOMATIC COOLING CONTROL

One of the major causes of inefficient compressed air operation is unbalanced cooling. For example, overcooling wastes water, causes deterioration of compressor lubricant by condensation in cylinder head. On the other hand, undercooling reduces compressor capacity, may result in serious damage to cylinders, pistons, valves and seats.

To offset this, many compressor manufacturers such as Schramm, Ingersoll-Rand, and others install Sarco automatic cooling controls at the factory. These controls are self-modulating, insure optimum cooling effect with minimum water consumption regardless of load variation, changes in pressure and temperature of water supply.



Sarco cooling controls are installed to regulate the water supply to cylinder jackets so that jacket discharge temperature is between 100-115° F.

CONDENSATE REMOVAL

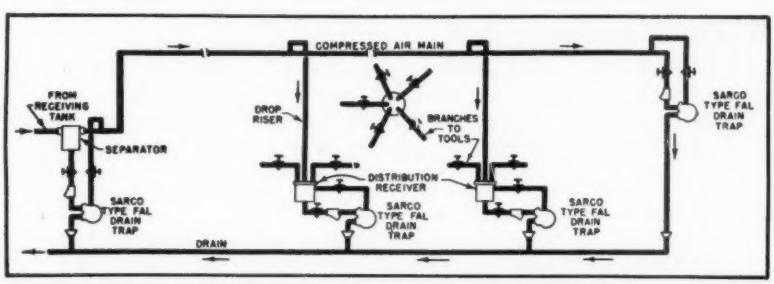
If condensation is not kept to a minimum serious damage can result to tools, paint surfaces, molds, etc. Other results of excessive condensation in the system are water hammer and freezing of mains, receivers and tool exhausts.

To prevent this, well-designed compressed air systems usually have Sarco drain traps installed at the aftercooler, on separators, at receivers, and on low points in the lines to remove water as quickly as it collects.

FREE TECHNICAL ADVICE

Sarco engineers have prepared a technical bulletin designed to pass on to compressed air users practical advice on how to improve air compressor operation. It also contains simple hook-ups of Sarco cooling controls and drain traps.

This bulletin may be obtained without obligation by writing the Sarco Company, Inc., Empire State Building, N.Y. 1, N.Y. Also represented in principal cities.



Drain traps at critical points in the distribution system effectively remove condensate—protect compressor equipment, tools, and work.

(ADVERTISEMENT)

For more facts circle 533 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 40)

Inside duct, lead strap will be welded over steel straps stud-fastened to shell

is required for the handling of corrosive liquids or fumes, strapped lead lining can be applied with a stud driver. The driver will secure steel straps to a lead-lined vessel without the necessity of drilling and matching bolt holes. Normal procedure for covering the steel straps with a strip of lead burned to the lining is followed as a final step in providing an entire lead lining.

In one case, installation of a lead lining in a tank 35 ft deep was accomplished, without the use of an outside scaffold, by working from the inside and using a stud driver. The time required for this job was less than half of that normally involved.

The maximum thickness of strapped lining thus far successfully fastened with a stud driver is through ¼ in. steel strap, plus ¼ in. lead lining, plus ¼ in. steel shell.

There is evidence that the thickness of the lead is inconsequential inasmuch as it behaves more as a lubrication for the steel stud rather than as an impediment.

This method of erecting lead linings is making its mark on the continuing and expanding use of lead in the changing technology of modern times. *From Lead, published by Lead Industries Association, New York 17, N. Y.*

Welding Repairs Broken Cutters

CRACKED MILLING CUTTERS, which formerly had to be discarded, are now being repaired in our plant and put back into service the same day as they are damaged.

By use of special fixtures, good welding equipment, and a better-than-average welder, repairs of these high carbon tools can be a routine maintenance operation.

The two pieces of a broken circular cutter are fitted together on a simple fixture made from a surface-ground boiler plate. This fixture serves as a level platform on which the pieces can be accurately reassembled.

Fitted and aligned, the two parts of the cutter are next secured with C-clamps and tacked in two places with an electric arc. The cutter can then be placed on a 7- by ¼-in. abrasive wheel and a deep groove made along each side of the crack for better welding.

Tacked and grooved, the cutter is placed in another fixture for pre-heating and welding. This device consists of two steel rings cut from 10-in. ID pipe. With the cutter lying between them, the rings are tightened by means of four ½- by 4-in. bolts. Four smaller bolts, attached to steel cross-pieces in each ring, are screwed tight against the cutter to secure it.

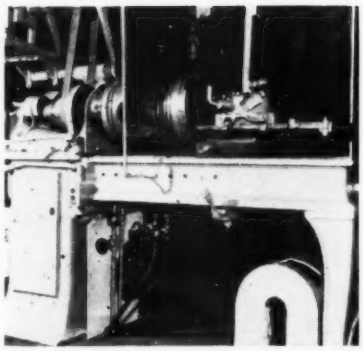
The welding operation requires about 30 minutes, excluding set-up and pre-heating time. After welding, cutter temperature is normalized and the tool, still in its fixture, is placed on edge inside a box, to cool. With cooling completed, the weld is ground flush with the cutter surface, and the tool is again ready for service. *From a release of Temco Aircraft Corporation, Dallas, Texas.*

Cracked milling cutter shown sandwiched inside fixture ready for welding

Old Lathe Makes Welding Stand

WITH AN INEXPENSIVE but efficient set up embodying a 30-year-old, salvaged lathe, sigma welding is being used by one railroad to reclaim aluminum pistons. Piston ring grooves and crowns are rebuilt and cracks are repaired. Cost of reclaiming a piston is about $15.00.

A sigma torch is used for all three welding operations. To rebuild the ring grooves, the piston is placed in a horizontal position and the sigma torch, held in a simple bayonet fixture above the work, is applied.



Salvaged lathe makes basis of machine on which aluminum pistons are repaired

Each groove receives three or four overlapping passes at a speed of 12 in. per minute. In this manner the groove is rebuilt in about 14 minutes.

Piston crowns can be rebuilt on the lathe by using an arrangement that allows rotation of the piston in a vertical position. As the piston revolves under the torch, a smooth even bead is deposited. At each revolution the torch is racked in (or out) to produce concentric, overlapping weld beads until the entire surface is rebuilt.

For repairing cracks, the sigma torch is lifted from its holder and used manually. *From Linde Metalworking Bulletin, published by Linde Air Products Company, Div. UCC Corp., New York 17, N. Y.*

Scrubbed Flue Gas For Pure CO_2

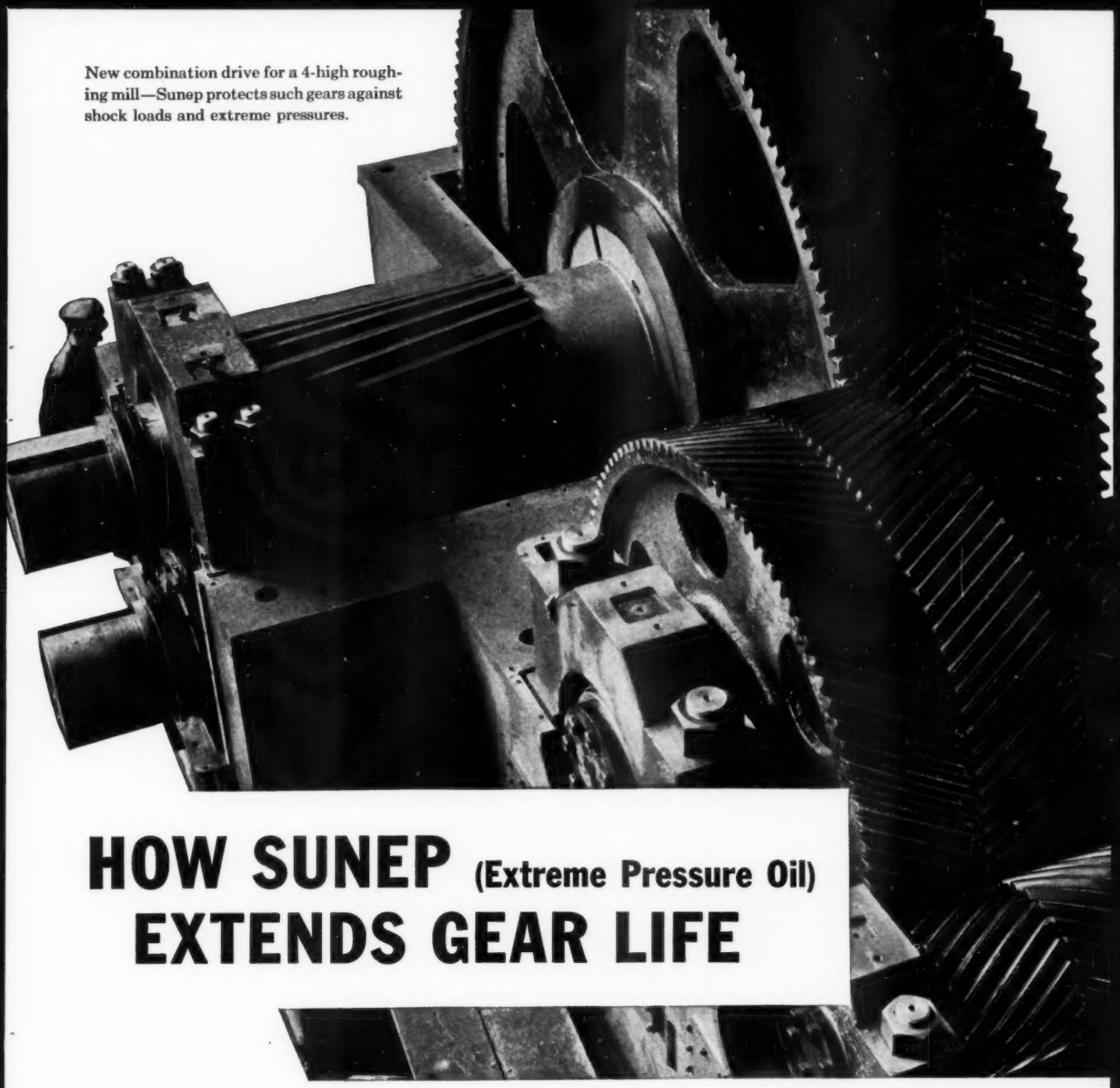
ONE COMPANY PRODUCING pure carbon dioxide, used chiefly in the beverage, fire fighting and coal mining industries, is Cardox Corporation.

Raw material in the form of flue gas containing about 12½ per cent carbon dioxide is received by the plant from two nearby units of the Appalachian Electric Power Company. A primary gas fan atop the high pressure boiler room, pumps the gas through a 30-in. main connecting the plants.

After the gas is received, it flows through a primary scrubber where part of the sulphur dioxide is removed, together with fine particles of fly ash. A second scrubber repeats the process, removing the remaining sulphur dioxide and fly ash, and at the same time, neutralizing the gas chemically.

The twice-scrubbed gas next enters an absorption tower where it gives up oxygen and nitrogen, and is put into solution. This solution is then pumped through a series of heat exchangers to a liberating tower where it is boiled. In the boiling process carbon dioxide is released.

Final steps are to pass the carbon



New combination drive for a 4-high roughing mill—Sunep protects such gears against shock loads and extreme pressures.

HOW SUNEP (Extreme Pressure Oil) EXTENDS GEAR LIFE

The advantage of running your machines at high speeds and under heavy loads can be quickly lost if your extreme pressure lubricants turn thick, lose film strength, or cause gears to corrode.

Sunep gives your gears better protection longer. Unlike many E.P. oils, Sunep is made from highly refined, premium grade oils skillfully blended with chemical additives that do not drop out during operation or in prolonged storage. This accounts for several rare user benefits: long life at extreme pressures; absence of corrosion—even on bronze; rust protection for steel parts; clean gears and bearings as a result of the oil's high stability.

Primarily a lubricant for enclosed gears, Sunep has proven to be highly effective on bearings and screws working under extreme pressures. Because of its exceptional clinging characteristics, Sunep guards against metal-to-metal contact during the early moments of machine operation after shutdown. FREE BULLETIN. Tells all about Sunep. Get your copy. Write Dept. PY-8

INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY

SUNOCO®

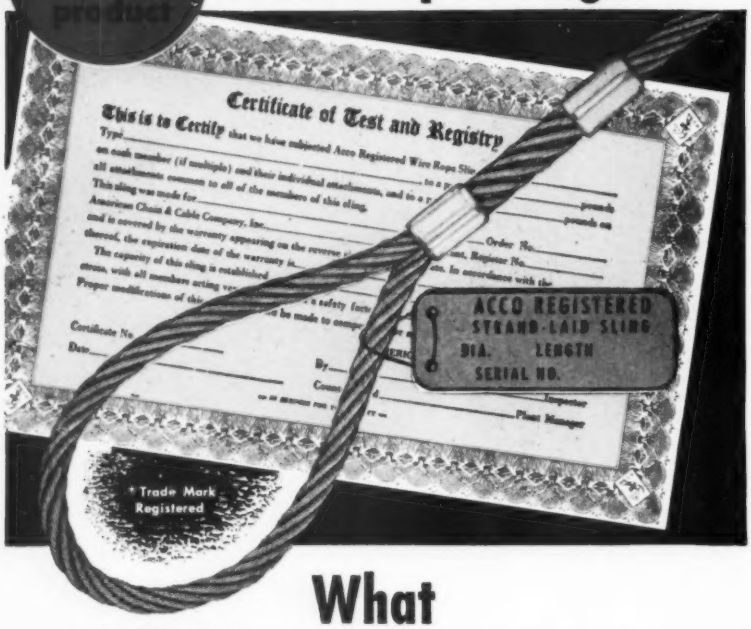
PHILADELPHIA 3, PA. • SUN OIL COMPANY LTD., TORONTO & MONTREAL

Refiners of famous High-Test Blue Sunoco Gasoline

For more facts circle 528 on Reply Card

ACCO Registered* Wire Rope Slings

an ACCO product



What ACCO Registered Means

• Primarily it means greater safety for your men and machines when loads are carried in the air in your shop. It means insurance against dropping a load which could tie up production.

But that's only part of the story. The name ACCO *Registered* on the slings you use means greater efficiency because of better design of endings and attachments. It means lower overall sling costs because every part of every ACCO *Registered* Wire Rope Sling has the same strength as the catalog breaking strength of the rope itself. ACCO even magnafluxes each hook to make doubly sure it will serve you well.

And it means that the sling has been proof-tested at the factory to twice its rated capacity. You can be sure that every ACCO *Registered* Wire Rope Sling is the safest, strongest and lowest cost lifting tool you have ever used.

Best of all, you can get them when you need them from a nearby stock. Contact your ACCO *Registered* distributor today for full information and prices. Or, write our Wilkes-Barre, Pa., office.

1. The best material
2. Unit safety factor (on bodies, rings, links, safety shackles, hooks)
3. Proof test of complete sling to twice rated capacity
4. Actual field service test of each model
5. Metal identification tag on each sling
6. Signed Registry Certificate with each sling

ACCO

TRADE MARK

Wire Rope Sling Department
AMERICAN CHAIN & CABLE

Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex., Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.
In Canada: Dominion Chain Co., Ltd., Niagara Falls, Ont.

plus Links Shackles Hooks

For more facts circle 535 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 40)

Flue gas travels along this 30-in. main between plants to be processed into CO_2

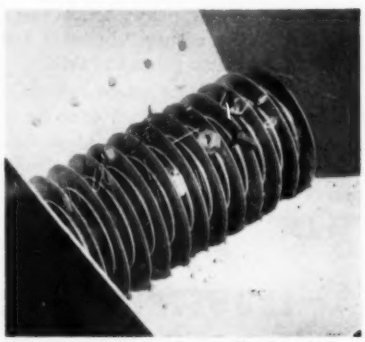
dioxide through coolers, which reduce its temperature to that of the surrounding air, then through a purifier, where all obnoxious odors are removed. Pure carbon dioxide is the result of these processes.

For storage purposes, the gas is cooled, compressed and liquefied at a temperature of —20 F and put into a 125-ton receiver at a pressure of 250 psi.

Running at maximum capacity 24 hours a day, the plant produces 1½ tons of liquid carbon dioxide per hour. *From The Illuminator, published by the Appalachian Electric Power Company, Roanoke, Virginia.*

Magnet Cleans Pellets

ELIMINATION OF STRAY ferrous metal from plastic pellets has been accomplished simply and efficiently by



Permanent magnet traps ferrous scrap in plastic pellets during bagging process

the installation of a permanent magnet in the mouth of the automatic bagging scale at the Apex Tire and Rubber Co., Pawtucket, R. I.

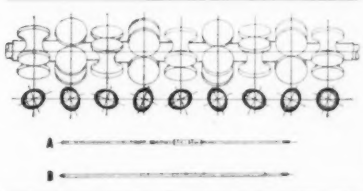
The 15-in. hopper magnet consists of a series of 6-in. dia circular magnetic discs placed at 1-in. intervals around a magnetic core. It is installed by laying it in the throat of the hopper where it attracts and holds stray ferrous metal present in the plastic pellets flowing past it. The unit is cleaned by wiping it with cloth. *From a release of Eriez Manufacturing Company, Erie, Pennsylvania.*

Automatic Mill Produces Seamless Steel Tubing

TWELVE MEN and a machine convert 27-in. solid steel billet into seamless tube at the rate of 120 ft per minute at the plant of Globe Steel Tubes Company, Milwaukee, Wis.

The machine is the Foren Mill, invention of a Globe Steel engineer.

It is capable of turning out stainless steel, carbon or alloy seamless tubing of 1½ to 4½ in. at close tolerances. Both interior and exterior surfaces have fine-grained smoothnesses.



Diagrammatic representation shows billet passing through roll sets in mill. A, B show relative elongation of billet

The mill is automatic and continuous. Multiple rolls cover the entire surface of the tube and long mandrels support the tube interiors.

First step in the process is to move the billets by conveyor to a 10-by 80-ft oil fired furnace for gradual heating, followed by discharge to a Mannesman piercer. Pneumatic rams insert the 40-ft long mandrel bar.

With billet and mandrel correctly positioned an automatic gate admits the billet to the first of 11 roll stands. Each roll set is independently driven through reduction gears.

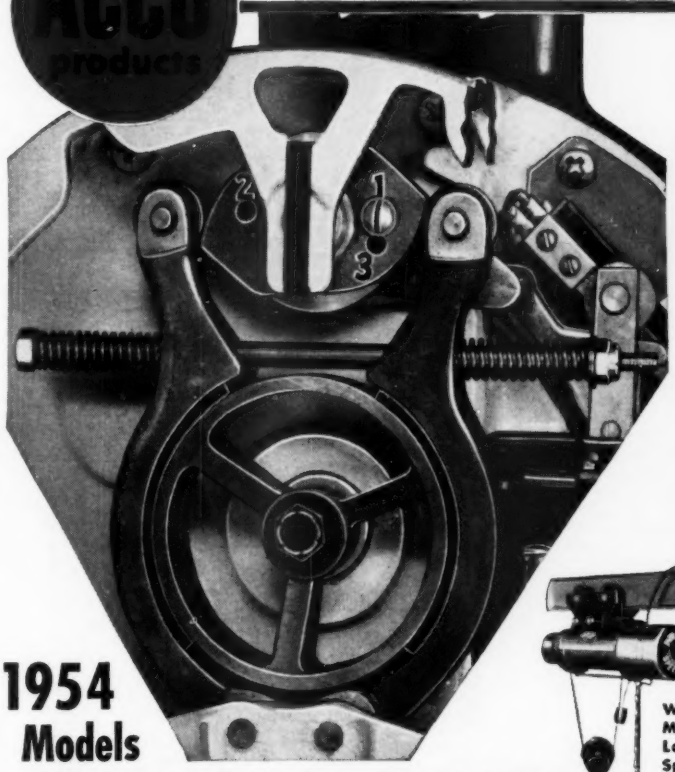
The first rolls reduce the diameter of the billet so that the inside surface engages the full length of the mandrel.

The next rolls, positioned at angles to one another, simultaneously produce elongation of the tube and reduction in its diameter and wall thickness. The remaining rolls round the tube perfectly, size it for diameter and free it from the mandrel bar.

From this operation, the tube moves

ACCO products

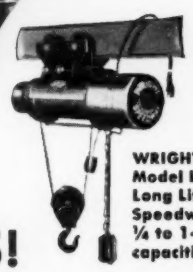
Wright Hoists



1954 Models

SMASH MAINTENANCE COSTS!

...Nothing to adjust but the cam!



WRIGHT Model L-1 Long Lift Speedway ¼ to 1-ton capacities

• The brake assembly pictured above for the WRIGHT FRAME 1 SPEEDWAY HOIST is your assurance of maximum hoist service... minimum down-time. Adjustment of this cam-actuated brake to compensate for brake lining wear is literally "as simple as ABC." *There is no guess work about it.*

When the load hook starts to drift, remove the screw shown at position No. 1 (*see picture*), swing the cam around so that position No. 2 is in line, and replace the screw that secures the cam to the solenoid lever arm. For the final one-third of brake lining wear, set the cam at position No. 3. This repositioning of the cam is the ONLY adjustment to be made by the users of WRIGHT Hoists. The brake springs and solenoid are factory-set... NEVER need adjustment for brake lining wear.

Long life is a built-in characteristic of these hoists. They are built and guaranteed for service to the limit of the duty cycle of 30 minute, totally enclosed NEMA specification motors. These 1954 models provide full accessibility of parts for lowest maintenance costs. To get at the brake and controller, you remove two screws which hold the end cover. To get at the limit switch, transformer, and solenoid coil, you remove three screws and the side cover comes off. With this full accessibility you can make a brake adjustment or replace electrical parts in a matter of minutes.

Remember, PRICE + MAINTENANCE = COST. For full details on the low-cost WRIGHT Frame 1 Hoists see your WRIGHT distributor or write our York, Pa., office for literature.

ACCO

Wright Hoist Division

AMERICAN CHAIN & CABLE

Hoists Trolleys Cranes

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

For more facts circle 536 on Reply Card

New-type multi-purpose box

BOOSTS PRODUCTION CUTS COSTS!

Check these WORK-O-MATIC features!*

1. **WORK-O-MATIC DROP-BOTTOM BOX.** Exclusive Union Metal square corner box of heavy gauge corrugated steel, with outturned 1" triangular bead flanges at top and bottom.
2. **CORNER STACKING ANGLES.** Permit safe group stacking—one box on another—saving valuable floor space by putting air space to work. Designed to stop end or side shifting.
3. **HINGED CHUTE BOTTOM.** Lowering of operator-controlled truck forks hinges bottom downward, automatically sliding parts into work-level tray.
4. **HEAVY-DUTY WORK-POSITIONING STAND.** Receives box from back or sides. Is safely, easily transported by lift truck from one work station to another when desired.
5. **CONTROL GATE.** Vertical adjustment controls constant flow of different size parts to service the work station.
6. **WORK-LEVEL TRAY.** Feeds parts to work station eliminating costly, tiring, hazardous stretch-bend-stoop methods. *Reservoir feature* cuts "down time" during interchange of supply boxes.
7. **SLOPING TRAY END.** Assures maximum part accessibility. Easily removed during "job finish-off". Speeds job changes.

These are only a few Work-O-Matic features making as much as 52.8% production gains at thousands of work stations. Get all the facts by writing to The Union Metal Manufacturing Company, Canton 5, Ohio, for Folder MH-809 and T. & M. Studies.

*Patent No. 2,445,038. Other patents pending.

UNION METAL

Materials Handling Equipment

For more facts circle 537 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 40)

to an extracting table where the mandrel bar is removed and diverted to a cooling trough. The tube then goes to a reheating furnace, after which a reducing mill establishes its finished diameter.

After moving through straightening and cutting machines the tube is subjected to hydrostatic tests and inspection.

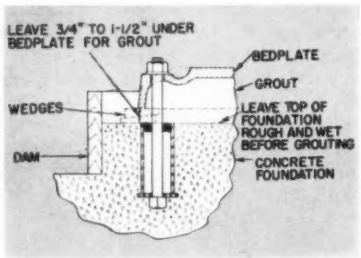
The various operations are controlled automatically by the mill foreman from his desk. Three men attend the billet-heating furnace, and a fifth manipulates the push buttons and pneumatic controls of the piercing mill and mandrel-inserting table.

A technician is stationed at the point where the mandrel is removed, while two men are in charge of the reducing mill. One man in charge of lubrication and another in charge of maintenance are other members of the team of twelve men occupied with the complete manufacturing operation. *From The Bearing Engineer, published by The Torrington Company, Bearings Div., Torrington, Connecticut.*

Foundation Aids Pump Service

FOR THE BEST POSSIBLE service from pumping equipment a substantial foundation is necesary.

The foundation must be heavy enough to give rigid support to the bedplate and to absorb normal strains and shock encountered in service. A concrete foundation built up from solid



Sketch shows details of construction of good foundation for any type of pump

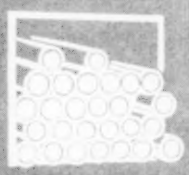
ground, properly grouted, is most satisfactory. When a pump must be supported in a structure or on steel work, the unit should be placed directly over a beam or as near to a main support or wall as possible.

Wooden, unsupported floors usually yield and may cause baseplate distortion and loss of alignment.

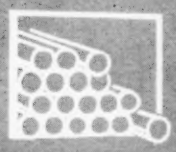
Adequate pipe supports will prevent

CUSTOM FABRICATIONS OF BOLTARON 6200 IN A WIDE RANGE OF SIZES AND SHAPES CAN BE CONSTRUCTED FROM THESE AVAILABLE FORMS:

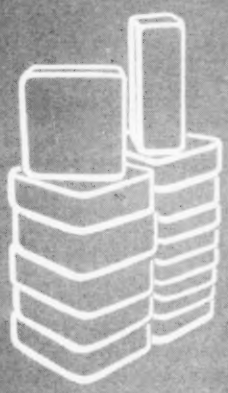
Molded Pipe Fittings



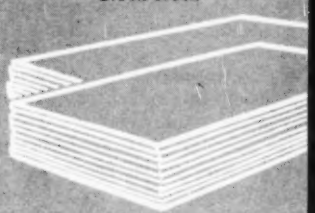
Lightweight, Seamless Pipe



Extruded Bar Stock



Block Stock



Laminated Sheets

Boltaron® 6200

WIPES OUT MAINTENANCE AND REPLACEMENT COSTS

This versatile, structural material (unplasticized Polyvinyl Chloride) resists corrosion indefinitely

Boltaron 6200 is an outstanding, non-metallic, rigid material, highly adaptable to complicated shapes and available in sheet, rod, pipe and block forms. It can be drawn, formed, molded, machined and hot air welded. Boltaron 6200 is corrosion-resistant throughout its entirety. It has chemical resistance to both strong and weak organic and inorganic acids, alkalies, alcohol and foodstuffs. It has already proven its value in hundreds of operations the world over.

Experienced engineering facilities are available to help you decide just where and how Boltaron 6200 can be used to stop corrosion in your plant. Trained fabricators coast to coast and in Canada will work with you.

Corrosion *can be* licked. Shutdowns *can be* eliminated. Replacement and repair from fume damage and dozens of other corrosive agents *can be* kept at an absolute minimum. The answer in your case may well be Boltaron 6200. Write Box 811 for more information.

H. N. HARTWELL & SON, INC.

Industrial Plastics Division • Park Square Building, Boston 16, Massachusetts

NEED EXTRA SHOCK-RESISTANCE?
Ask about high-impact-strength
Boltaron 7200, Greenline.

For more facts circle 538 on Reply Card

How LATTICE BRAID* Teflon† Packing saves Newton Falls Paper Mill, Inc. $1,000 a year on one machine

*Registered Trademark. *Only* Garlock makes LATTICE BRAID rod and shaft packings.

Up to a few years ago, Newton Falls Paper Mill, Inc., Newton Falls, N.Y., used an ordinary flax packing on the agitator shaft of a bleach chest employing liquid chlorine as the bleaching agent. With this flax packing there was a constant leakage of stock and bleach liquor, so Newton Falls decided to try our LATTICE BRAID Teflon Packing. The customer now reports that Garlock LATTICE BRAID: (1) *prevents* the loss of stock and bleach liquor, (2) has a *service life* of from 1½ to 2 years. This adds up to savings of $1,000 per year on *one* machine.

Put Garlock LATTICE BRAID Packing to work for your company. All the braided strands of this unique packing are lattice linked together into one structural unit. The strands hold together even when the packing is worn far beyond the limits of wear of ordinary braided packings.

LATTICE BRAID is made from flax, cotton, asbestos, wire-inserted asbestos, Teflon, and asbestos with Teflon impregnation—for various types of services.

Get all the facts about LATTICE BRAID *packings. Contact your Garlock representative or write for new folder AD-131.*

THE GARLOCK PACKING COMPANY, PALMYRA, NEW YORK

Sales Offices and Warehouses: Baltimore • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland Denver • Detroit • Houston • Los Angeles • New Orleans • New York City • Palmyra (N.Y.) • Philadelphia Pittsburgh • Portland (Oregon) • Salt Lake City • San Francisco • St. Louis • Seattle • Spokane • Tulsa.

In Canada: The Garlock Packing Company of Canada Ltd., Toronto, Ont.

† The Du Pont Company's Trademark

GARLOCK LATTICE BRAID PACKING

For more facts circle 539 on Reply Card

PLANT ENGINEERS' DIGEST

(Digest begins on page 40)

distortion of the pump casing and consequent increased wear due to rubbing and possible shaft breakage.

Pump should be level to avoid undue loads on the bearings, and with oil lubricated pumps, to insure equal lubrication to both bearings. This is easily accomplished by use of a spirit level and by plumbing the suction and discharge flanges.

Pump base must always be grouted before piping is installed, and piping must always be from the pump. *From Goulds News, published by Goulds Pumps, Inc., Seneca Falls, New York.*

Insulating Air Conditioning Lines

INSULATION FOR PIPING in air conditioning systems must prevent the formation of condensation on the pipes during the cold cycle of dual temperature lines. This is being accomplished by use of a cork covering fabricated

Insulation for air conditioning piping is flexible, applied with special adhesive

of precision-cut segments of corkboard backed by three-ply, vapor-proof paper.

The insulation is intended to prevent sweating where liquid temperatures in a line are 30 F or above and where the relative humidity of the surrounding air does not exceed 70 per cent.

On the hot water cycle, the covering should withstand temperatures up to 200 F without shrinking, drying out or crumbling.

Since the insulation is applied with a special adhesive which bonds paper to paper only, the paper can be cut and the covering itself salvaged, undamaged. The paper wrapping can also be given a colored finish for either identification or decorative purposes. *From Armstrong's Insulator, published by Armstrong Cork Company, Lancaster, Pa.*

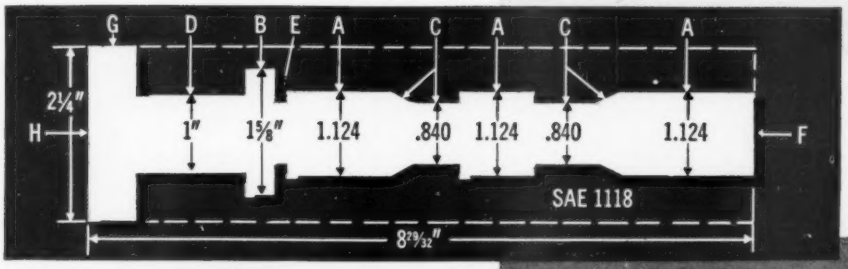
This is the difference High Velocity Turning makes

IN 1947 this job took...

11.50 min.

FLOOR TO FLOOR

A. Turn — 694 RPM — .015" Feed
B. Turn — 489 RPM — .015" Feed
C. } Form — 119 RPM — .0025" Feed
D. }
E. Face, shoulder, neck, undercut, HSS
F. Face 243 RPM — .0035" Feed
G. Knurl
H. Cut off — 243 RPM — .0035" Feed



IN 1954 this same job takes...

5.00 min.

FLOOR TO FLOOR

A. Turn — 1000 RPM — .022" Feed
B. Turn — 1000 RPM — .022" Feed
C. } Form — 340 RPM — .0035" Feed
D. }
E. Face, shoulder, neck, undercut
F. Face 489 RPM — .0035" Feed
G. Knurl
H. Cut off — 489 RPM — .0055" Feed

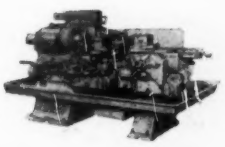
J & L TURRET LATHES GIVE...

MORE Ease of Operation
MORE Power Transmission
MORE Rigidity
MORE Accurate Stops
MORE Efficient Lubrication
MORE Coolant on Cutting Tools
MORE Accurate Results

Turning out a job like this in 5 min. calls for a lathe with plenty of power and the beef to back it up . . . a lathe like the Jones & Lamson #7A Universal Turret Lathe, which is specially designed to meet today's demand for more production at lower unit costs.

Only with a lathe like this can your shop take full advantage of the quality, productivity and lower costs offered by High Velocity Turning.

This job is one of the many turned at high speeds on our production line. Come to Springfield and see for yourself. At any rate, send for catalogs #101-A and #102.



JONES & LAMSON

Machine Tool Craftsmen Since 1835

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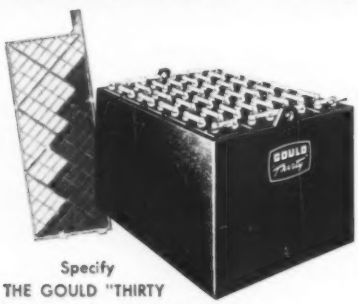
POWER PACKED ACTION for Today's Industrial Trucks

THANKS TO BATTERY POWER!



Specify
THE GOULD "THIRTY
with New Diamond "Z" Grids—
America's Finest
Industrial Truck Battery

The faster maneuverability of today's industrial trucks requires an unfailing source of power . . . battery power to keep them continuously on the go with a minimum of downtime and maintenance. No power can compete with battery power for utmost dependability, low cost of operation and power-packed, full-shift performance. Nothing can compare with the Gould "Thirty" with Diamond "Z" Grids, either. Brim-full of power-packed action, it gives you the lowest-cost industrial truck power you can buy.

Always Use Gould-National Automobile and Truck Batteries

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For Railroad Air Conditioning and Lighting | For Mine Shuttle Cars and Locomotives | For Electric Industrial Trucks | For Diesel Locomotive Starting | For Standby and Emergency Power

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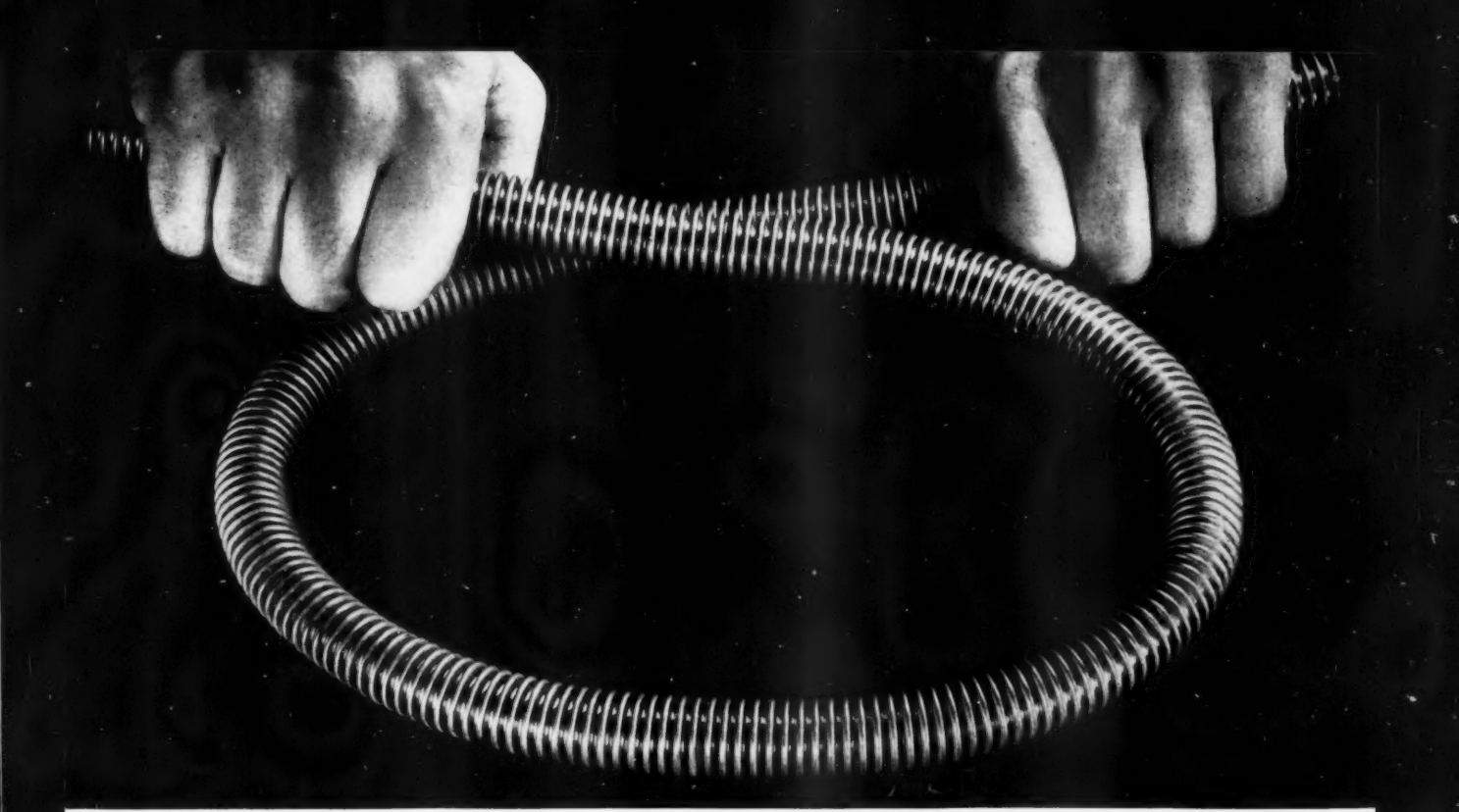
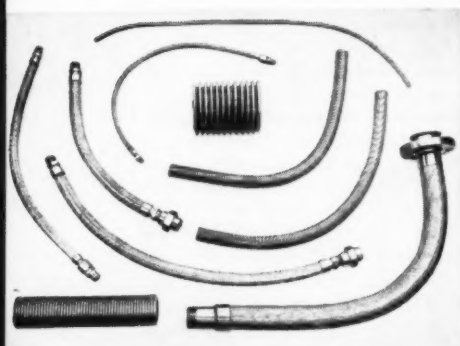


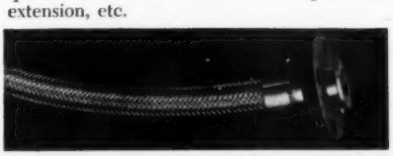


WIDELY USED in processing of food and chemicals, American Flexible Stainless Steel Tubing is engineered to design requirements.

OPEN PITCH tubing for conveying corrosive liquids and gases, exhaust, hot air, etc. under infrequent movement conditions.

STAINLESS STEEL BRAID gives extra strength to tubing for high pressure service.

CLOSE PITCH tubing for extra flexibility, frequent movement, vibration, compressions, extension, etc.



ASSEMBLIES, complete with fittings attached, manufactured to your specifications.

American Flexible Stainless Steel Tubing meets tough design "specs"

- **Conveys corrosive gases and liquids at high temperatures—high pressures**
- **Stands up under continuous flexing**
- **Absorbs severe vibration**
- **Compensates for misalignment**
- **Takes movement and offset motion**

Today industry looks to "American"—a leader for over forty years in the manufacture of flexible metal hose and tubing — as a dependable source for flexible *stainless steel* tubing. This tubing is specially engineered and manufactured to give desired flexibility with greatest durability.

American Flexible Stainless Steel Tubing is annularly corrugated, and is made in both open and close-pitch construction. It is available in Types 316 and 321, ranging in size from ¼" I.D. through 4" I.D. Assemblies are made up with or without wire braid covering to meet most industrial working pressures. American stocks a line of standard fittings. These are attached to the tubing in our own plant by Heliarc welding or silver brazing.

Send us details of your connector problem. "American" engineers can help you solve it.

WHEREVER CONNECTORS MUST MOVE

AMERICAN

flexible metal hose and tubing

an ANACONDA® product

FREE BOOKLET!

Gives engineering data on construction and types of American Flexible Stainless Steel Tubing. Includes information on fittings. Write today for your free copy.

The American Brass Company, American Metal Hose Branch, Waterbury 20, Conn.

Please send me Bulletin STC-1 on American Flexible Stainless Steel Tubing.

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For more facts circle 542 on Reply Card

OPERATION AND PRODUCTION pointers for the industrial plant engineer

Edited by H. E. B. Anderson

Paint Fences By Flow

FLOW COATING in field maintenance painting, as developed by James B. Sipe & Co., is not a standardized operation, but is best varied to suit local conditions. Equipment can be built to meet individual requirements of the work.

To prepare a woven wire fence for flow-coat painting, sufficient cleaning must be done to remove loose scale, dirt and rust. A large brush, similar to a street cleaning brush, is satisfactory for this operation.

Where the fence is pitted or covered with scaly rust, a coat of rust-killing agent at a specific gravity between 0.825 and 0.830, should be applied by flowing. This should be followed by a coat of inhibitive metal primer, then the finish coat.

According to Sipes engineers, not all paints can be flowed successfully. A careful combination of proper oils, thinners, pigments and driers, with the correct pigment-vehicle ratio, is required to build a paint suitable for flow-coating. In addition, the consistency of the paint must be controlled for uniform results. For example, aluminum paint flows best at a specific gravity between 0.885 and 0.895.

A small platform truck, built to carry the pump and motor that moves the paint through the discharge hose, can also mount the paint supply tank. This arrangement facilitates moving the equipment along the fence, and also provides an elevated stand for the painter's use while painting.

Fig. 1. Flow coating method of fence painting uses poured stream of paint

Fig. 2. Point of paint application is lowered to provide complete coverage

Catch pans, which are placed under the fence to collect excess paint as it drains, are made of 24- or 26-gage sheet steel. A satisfactory size has been established at 5-ft length, 6-in. width, and 3-in. depth. The pans are constructed with an offset at each end, that extends over the concrete foundation of each post, and the offset is cut out to fit snugly around the posts themselves.

Baffle plates, of light metal (stiffened if necessary) are fitted with hooks to slip over the top fence rail. They should be short enough to clear the catch pans by several inches, to permit easy movement of the pans along the fence.

Splash plates, 18 in. wide and 4 ft long, can be used to catch any deflected paint and run it into the catch pans.

The paint, which is pumped through a ¾-in. hose, is sent through a flattened nipple which functions as a nozzle, and is allowed to flow over the wires and posts in the fence. Only enough paint is sent through the hose to make a full stream at the nozzle. Flow of the paint over the fence coats the entire fence, including the joints of the wire strands, which are difficult to paint with a brush.

Extinguisher Station Provides Protection, Teaches Safety

Extinguisher station is typical of several located in new Appliance Div. plant of Westinghouse Electric Corp., in Columbus, Ohio. Various combustible materials for which the extinguishers can be used are printed plainly beside each unit. Workers are easily able to familiarize themselves with this important information

Point of Operation Punch Press Guards

Contributed by Ross Trowbridge
Barcalo Manufacturing Co.

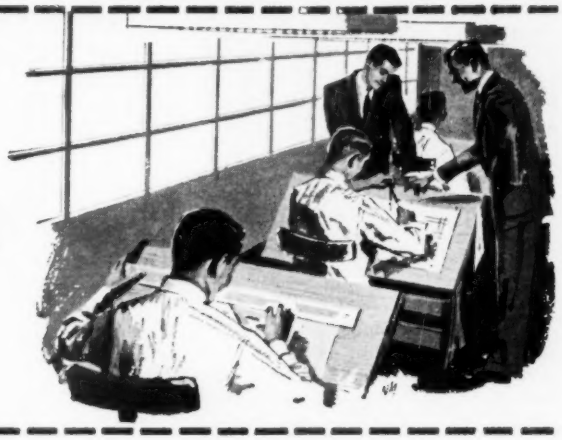
DESIGNED TO PROTECT workmen's fingers at the point of operation on our punch presses, a square spiral wire guard has been developed and installed.

First consideration was to make it difficult for an operator to get hurt. Second, to create as little interference as possible with the operation being performed, and third, to make it possible to remove the guard for punch or die changes without removal of bolts or screws.

A square spiral spring of 11-gage wire was chosen, since this convoluted form allows the spring to be compressed flat on top of the guard base, to remove the entire unit. This shape

Stale air lets thinking slump

Fresh air helps ideas jump!



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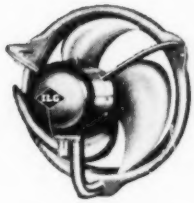
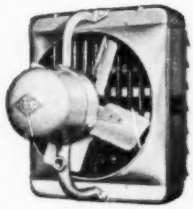
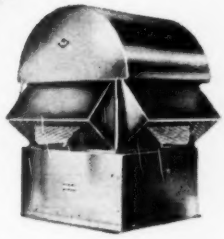


ILG Propeller Fans
Feature ILG's self-cooled motor, direct connected to fan wheel—assures extra quiet, low-cost operation. Sizes from 6" to 72".



ILG Unit Heaters
The complete line — steam, hot water, gas or electric—with capacities ranging from 18,600 BTU to 286,000 BTU.

ILG Centrifugal Fans
Designed for a wide variety of pressure and volume requirements—certified capacities ranging from 374 CFM to 116,400 CFM.



ILG Power Roof Ventilators
Long-lasting, quiet, easy to install, leak-proof — provide efficient ventilation independent of wind and weather.

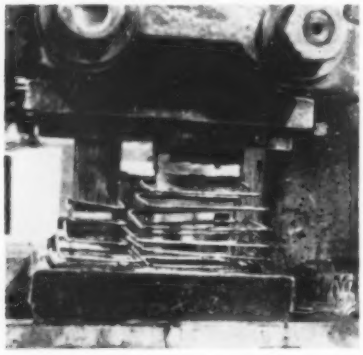
For more facts circle 543 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

also conforms more to the general shape of the surface of the dies, and is more easily attached to the base foe for support.

The openings between the convolutions of the spring were kept at a maximum of ⅜ in. This opening effectively keeps fingers out of the die and allows the operator to see what he is doing while feeding stock. It is also large enough to permit him to lubricate the punch with a long bristle brush, inserting it through the openings in the spring.



Square spiral-wound wire guards keep fingers out, yet do not obstruct view

Lamp Cleaning by Tank

LIGHTING FIXTURE cleaning costs at the Jenkintown, Pa. plant of Standard Pressed Steel Co., have been cut more than 50 per cent by the simple expedient of mounting a cleaning tank on a four-wheel cart, and cleaning the fixtures and lamps "on the spot."

Past practice at SPS had been to heap a load of about 20 fixtures and lamps on a push truck, transport them to a heated tank of water elsewhere in the shop, clean them, reload the truck and push it to the next area where cleaning was to be done.

This required a considerable inventory of extra fixtures and lamps so that there would be no blacked-out area while a batch was being cleaned. The job kept one man busy full time on the third shift, and even with an occasional helper, he had difficulty keeping lamps and fixtures clean throughout the plant.

The new mobile cleaning tank has shortened cleaning time to the point where one man, with no helper, can easily handle the job in four hours each night, and labor costs have been more than halved.

The inventory of spare fixtures and bulbs has been drastically reduced, because with "on-the-spot" cleaning, only four or five are removed at once.

Two-compartment cleaning tank on wheels facilitates light fixture cleaning

Designed completely by SPS engineers, the tank was built in the shop. It is divided into two compartments, one for detergent solution and one for rinse water. Each compartment is 5 ft. long, 1½ ft. wide, and 1 ft. deep, and each has a 440-volt Chromax heating element mounted near the tank bottom. Piping is welded to one end to form a convenient handhold for pushing the cart, and a steel box welded on the same end holds a supply of detergent.

Metal Blanks Fanned by Magnetism

UNIQUE APPLICATION of permanent magnetic forces permits a punch press operator to lift individual blanks or

(Continued on page 56)

Shaft Repair Method Uses Fabricated Dies on Hydraulic Press to Produce Parts

Contributed by H. Nye Josleyn

A METHOD originally devised for rebuilding worn deep well pump shafts can be applied to the repair of other types of rotating and reciprocating pump shafts.

For example, in the repair of a 1½-in. shaft, the damaged portion was turned down to a depth 0.006 to 0.008 in. less than the thickness of the 10-gage stainless steel which was to be used in the repair. It was not critical that all traces of the damage be removed.

Two pieces were cut from the stainless steel stock, long enough to fit snugly between the shoulders of the turned section. Each piece was cut to a width ⅛ in. less than half of the circumference of the cutout portion, and formed into rounded half-tube segments that fit into the depression.

The segments were shaped in a small shop press, using a shop-made punch and die, as shown in Fig. 2.

In fitting and clamping the segments on the shaft, they were spaced evenly, with an open ⅛-in. horizontal slot on each side. Using stainless steel rod, the segments were welded together along the seams. The same bead was used to weld the segments to the shaft, through the horizontal slot. The weld was extended about ¼ in. into the undamaged portion of the shaft, and for some additional strength, the weld bead was run around the outside circumference at each end of the segmented repair area.

As welded, the shaft was about 0.006 in. greater in diameter than the original shaft, which was sufficient clearance for turning and finishing the rebuilt section to original dimensions.

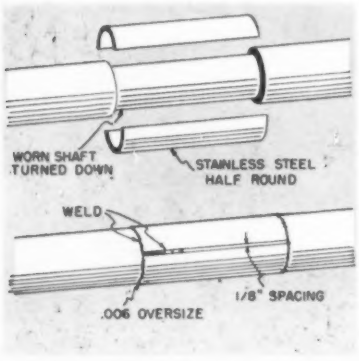


Fig. 1. Rebuilding method uses two shaped segments, welded into position

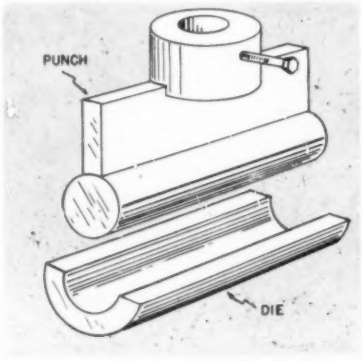


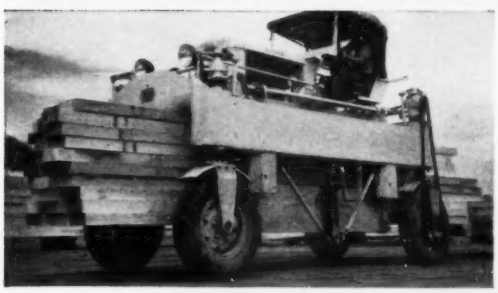
Fig. 2. Male and female die sections. Male section is welded to press collar

B.F.Goodrich

FREE TW ANALYSIS can solve your tire problems, reduce costs 20-50%

The B. F. Goodrich Tire and Wheel Analysis Plan has reduced industrial tire costs 20 to 50% for hundreds of users across the country. It has solved seemingly hopeless cases of abnormal tread wear and premature failures. The B. F. Goodrich TW Analysis can help you cut your tire costs. Contact your local BFG retailer or mail the coupon below. Without cost or obligation a trained B. F. Goodrich man will study your materials handling operations.

The TW man will tell you what type and size tires, what tread design and compound will serve you best. He will recommend ways to improve your tire maintenance program. The advice you receive will be unbiased, for B. F. Goodrich makes a *complete* line of industrial tires. A special TW Analysis is available for manufacturers of industrial hauling equipment.



Heavy equipment and loads? Overloaded tires fail prematurely. Let BFG show you how to properly match tire and load. Make sure you are using the correct inflation pressures for pneumatics.

Avoid tire failures like this. The tire pictured here failed prematurely. BFG's TW Analysis helps you discover the reasons for tire failure, prevents reoccurrences, saves you tire dollars.

Without cost or obligation. The TW man is an expert. His free analysis of your materials handling operations can help you cut tire and tire maintenance expense.

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- ☐ Additional information on your Tire and Wheel Analysis Plan
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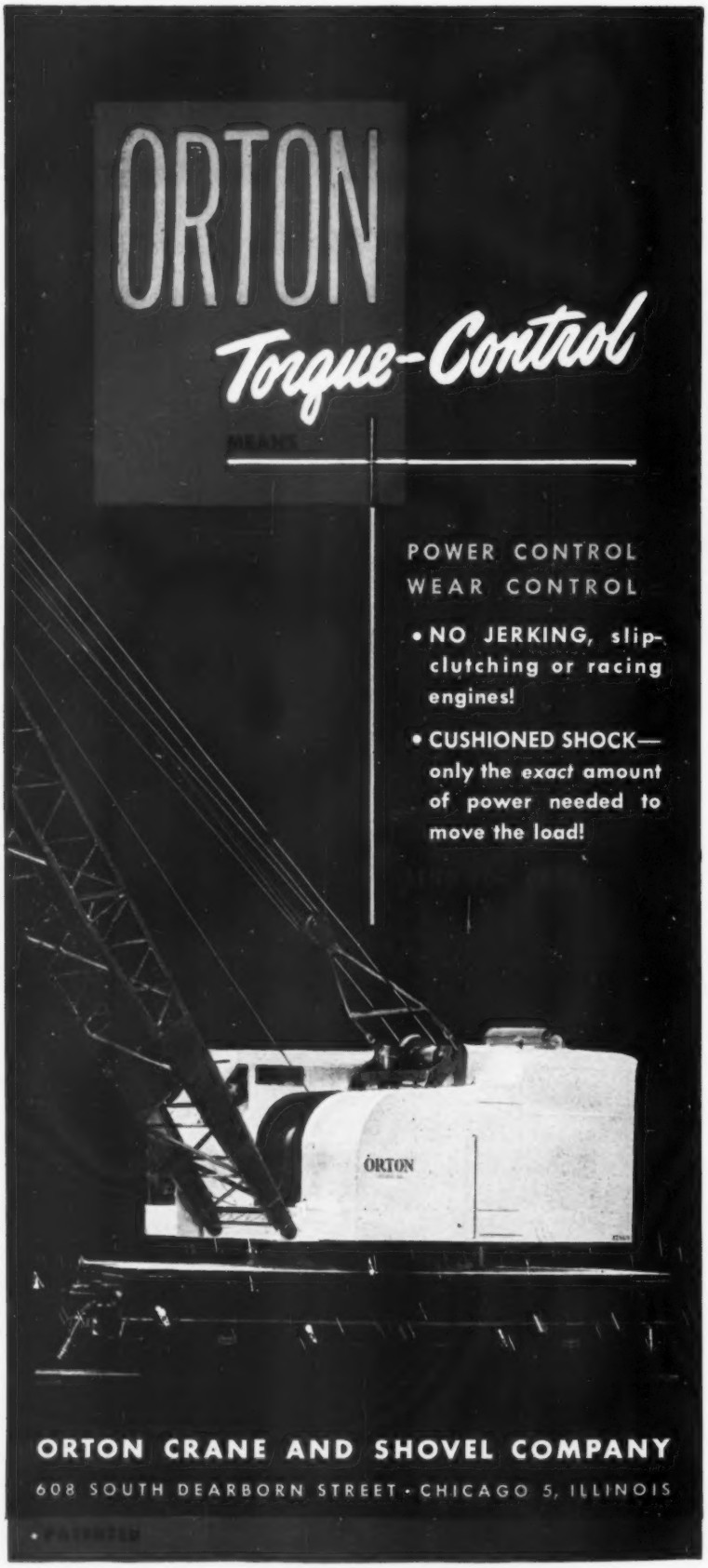
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• NO JERKING, slip-clutching or racing engines!
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OPERATION—PRODUCTION

(O and P begins on page 52)

lids from a pile without fumbling or delay. Production is speeded, operator fatigue reduced, the danger of double feeding (with its attendant possibility

Lightweight metal blanks are separated for easy press feed by magnetic fanner

of broken dies) is eliminated, the operator's hands are protected from cuts and scratches, and quality control is promoted.

Designed for optimum performance in separating very lightweight sheets, a sheet fanner manufactured by Eriez Mfg. Co., uses a permanent magnetic unit to induce like polarity in the pieces. This polarity causes them to repel each other to such a degree that the upper pieces in the stack tend to rise and are held in a suspended position, separated from one another. As each piece is taken from the top of the pile, others below it move up.

Bus Bar Anti-Corrodant

Contributed by L. W. Fitzpatrick

EXPOSURE OF COPPER to the atmosphere causes troublesome oxide formations in many bus bar installations. The subsequent increase in electrical resistance results in further temperature rise and equipment instability.

Copper oxide formation and corrosion can be minimized by coating surfaces with an inexpensive solution of cyanide and silver nitrate.

The material requirements to cover approximately 100 sq ft are:

2 quarts of distilled water,
1 ounce of sodium cyanide crystals, and
½ ounce of silver nitrate crystals.

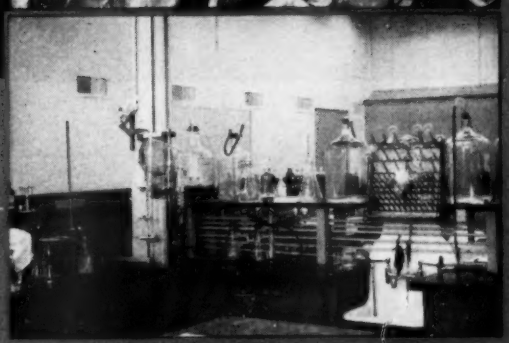
First, dissolve cyanide in distilled water. Add silver nitrate and stir

Parlon Stays On!

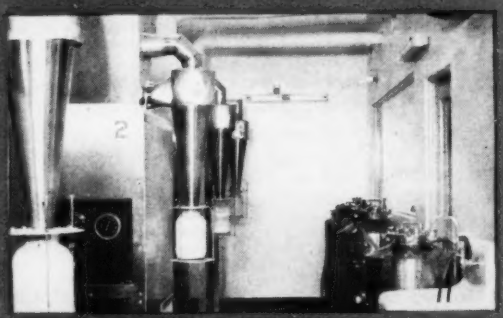
"Going strong after 2 years . . ."

RESISTS ACID (right). In this processing area of the R. K. Laros Co., fermentation, hydrolysis and fractionation of dextran takes place. Sanitary requirements mean constant washings of the room with strong detergent solutions. Alcohol and hydrochloric acid fumes are always present. Wooden ceiling, brick side walls, floor and all metal work except stainless steel are protected with same A&A Parlon-based finishes. Protective coating applied in 1952 is still in excellent condition.

RESISTS ALKALI (below). This spray-drying room, Chemical Division, R. K. Laros Co., still has a "just painted" look after two years. A&A Parlon-based paint, manufactured by Barreled Sunlight Paint Co., Providence, R. I., was put on over fresh plaster on walls and ceilings. It has resisted alkali in the plaster from underneath, frequent washings with a germicidal solution from without.



STAYS SANITARY (above). R. K. Laros Co. laboratory remains attractive and clean after two years service from A&A Parlon-based finish. Plaster and brick areas, wooden cabinets and metal grilles were all painted with the same finish and have resisted cumulative attacks of chemical and acid fumes.



Paint based on Hercules Parlon (chlorinated rubber) has been taking a beating for two years on all types of surfaces and under a variety of chemical conditions at the R. K. Laros Company plant in Bethlehem, Pa. Yet it still looks clean, sanitary, and fresh; and retains its original decorator colors.

From coast to coast, in chemical plants, refineries, paper and textile mills, sewage disposal plants—wherever paint must withstand corrosion, Parlon is giving outstanding service on both interiors and exteriors. Parlon is easy to apply on metal, concrete or wood. It is quick drying, and long lasting; providing you with better service at lower long-term costs. See your paint supplier for details on Parlon-based chlorinated rubber paints, or write Hercules—the producer of Parlon.

Cellulose Products Department **HERCULES POWDER COMPANY** *910 Market St., Wilmington 99, Del.*

LOOK FOR THIS LABEL ON THE PAINT CAN...

MADE WITH **Parlon®** HERCULES® CHLORINATED RUBBER

PARLON CHLORINATED RUBBER PAINTS ARE AVAILABLE FROM 400 MANUFACTURERS UNDER THEIR OWN BRAND NAMES

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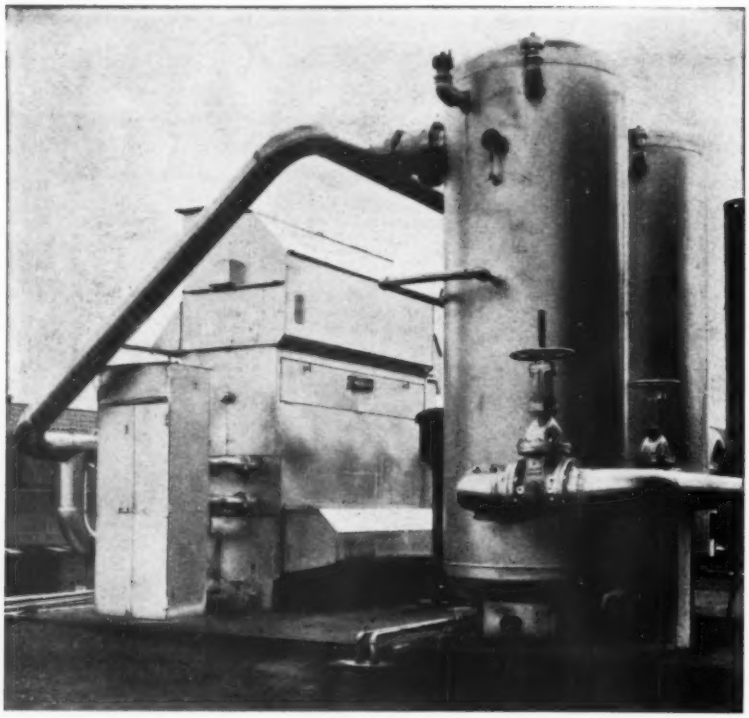


HOW YOU SAVE,
Getting Drier Compressed Air

● Direct saving in the cost of cooling water saves the price of the Niagara Aero After Cooler (for compressed air or gas) in less than two years.

Extra, for no cost, the drier air gives you a better operation and lower costs in the use of all air-operated tools and machines, paint spraying, sand blasting or moisture-free air cleaning. Water saving also means less expense for piping, pumping, water treatment and water disposal, or you get the use of water elsewhere in your plant where it may be badly needed.

Niagara Aero After Cooler assures all these benefits because it cools compressed air or gas below the temperature of the surrounding atmosphere; there can be no further condensation in your air lines. It condenses the moisture by passing the air thru a coil on the surface of which water is evaporated, transferring the heat to the atmosphere. It is installed outdoors, protected from freezing in winter by the Niagara Balanced Wet Bulb Control.

Write for complete information; ask for Bulletin No. 98

NIAGARA BLOWER COMPANY

Dept. PE 405 Lexington Ave. New York 17, N. Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

INDUSTRIAL COOLING HEATING • DRYING

NIAGARA

HUMIDIFYING • AIR ENGINEERING EQUIPMENT

For more facts circle 547 on Reply Card

OPERATION — PRODUCTION

(O and P begins on page 52)

solution thoroughly. Quantities can be reduced proportionally for smaller jobs.

This simple plating solution is a good substitute for more expensive electroplating. Care should be exercised in handling the solution as it is highly poisonous. Rubber gloves and a respirator must be used.

Acid-Resisting Clothing

WELL-KNOWN as a major source of expense at plating plants is the excessive damage done to employees' clothing by the splashing of caustics and acid plating solutions.

One company, Hanson-Van Winkle-Munning, has effectively offset these costs at its modern plating laboratory in Matawan, N. J. It was found that the cost of work clothing, with acid burns appearing after one day's service and ordinary work clothing becoming unserviceable in one week, was a major factor. Search for cost-reducing remedies resulted in a change of fabric in the clothing.

Outfitting the employees in Worklon shirts and trousers, of DuPont Orlon, solved the problem. Its acid-resistance and durability have in many instances provided six months of wear from clothing worn in the plating areas.

Adjustable Support for Wire Coils

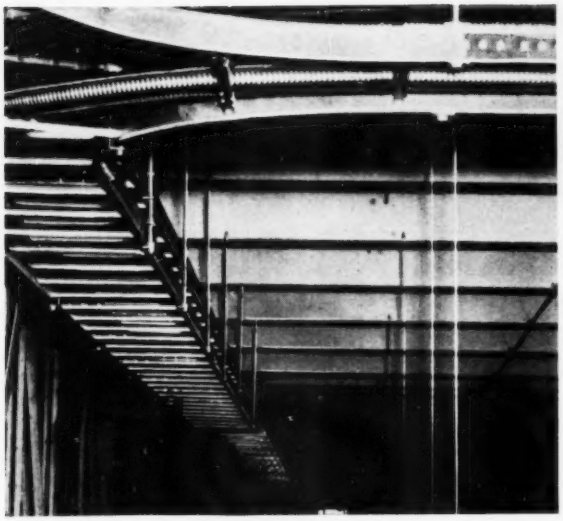
AN ADJUSTABLE tilt-type wireholder which works in conjuction with a spring winding machine has been developed at Long Beach Naval Shipyard.

The stand is adjustable for standard-size rolls of wire stock. Movement of a screw crank adjusts the three hinges to fit the inside diameter of the roll,

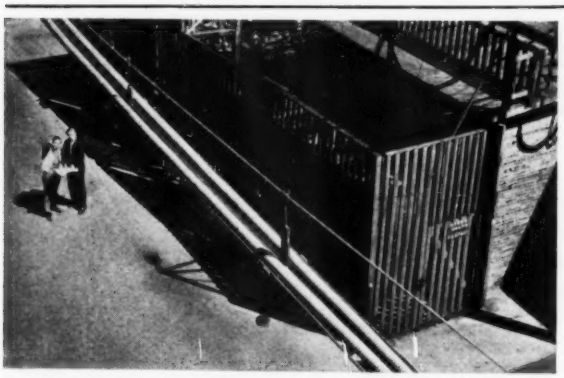
Wire coil holder can be adjusted to provide direct wire path to machine

WIRE AND CABLE INFORMATION DIGEST

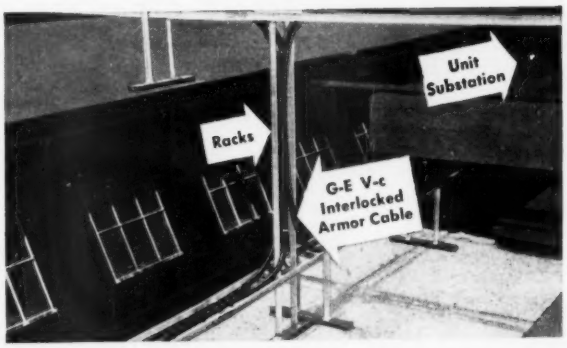
G-E V-c Interlocked Armor Cable cuts feeder installation costs on old or new construction



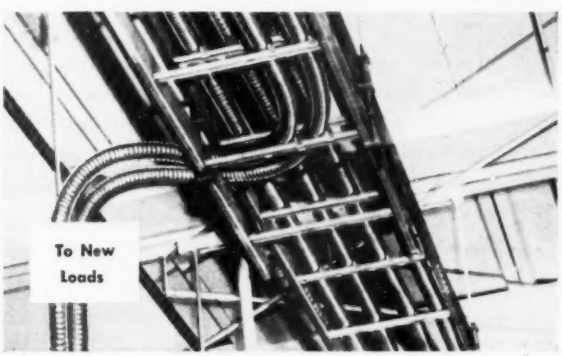
HANG IT FROM THE CEILING—You can install V-c interlocked armor cable in long unbroken runs over beams, around corners, even in unusually cramped areas. Splicing, where needed, is a simple mechanical job. These features often reduce layout and installation time by 50%.



HANG IT BETWEEN BUILDINGS—A G-E V-c interlocked armor cable system weighs only about one third as much as conventional cable and conduit. This means easy handling—indoors or outdoors. Fewer cables, plus simple messenger or rack support further reduce installation time.



RUN IT OVER THE ROOF—Uneven roof contours are no obstacle. Used this way, V-c interlocked armor cable frees working areas without expensive underground duct work or tearing up of concrete floors. It gives extreme economy and flexibility to power distribution.



MEET LOAD CHANGES QUICKLY—EASILY—G-E V-c interlocked armor cable primary or secondary feeder systems can be installed quickly. Each circuit is a separate, flexible cable that needs no conduit. You can easily expand or relocate any circuit to meet changes in load pattern.

PLAN FOR FUTURE EXPANSION IN YOUR CABLE SYSTEM—Write for this helpful booklet on G-E V-c cable, or call the G-E wire and cable specialist in your locality. Section W-145-864, Construction Materials Division, General Electric Company, Bridgeport 2, Conn.

REWIRE AMERICA ... WITH GENERAL ELECTRIC WIRING SYSTEMS

Progress Is Our Most Important Product

GENERAL ELECTRIC

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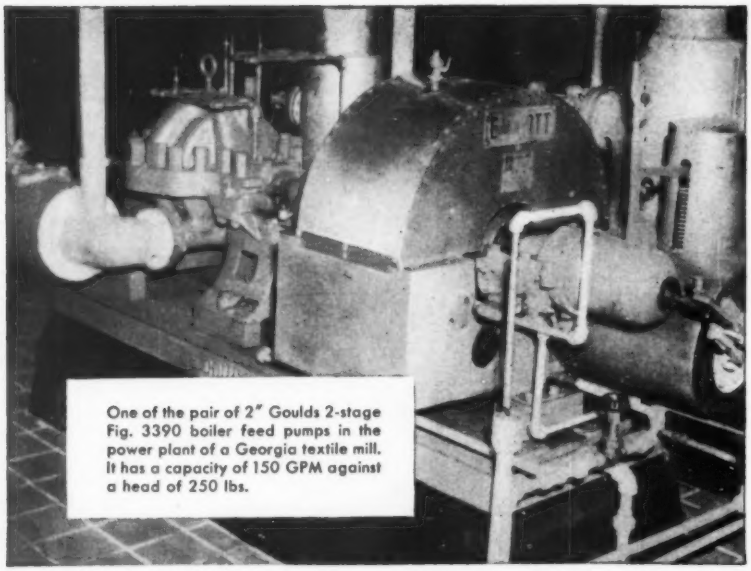


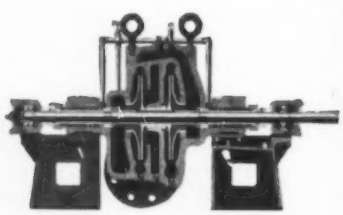
One of the pair of 2" Goulds 2-stage Fig. 3390 boiler feed pumps in the power plant of a Georgia textile mill. It has a capacity of 150 GPM against a head of 250 lbs.

Pair of boiler feed pumps going strong after seven years of round-the-clock service

When an important southern textile mill added a 100,000-lb. steam boiler to one of its power plants in 1947, it installed a pair of Goulds Fig. 3390 centrifugal pumps to feed it.

Since then these pumps have alternated in service at weekly intervals, each pump running continuously 24 hours a day, 7 days a week, when in operation—with only normal maintenance.

That's an example of the kind of performance you can expect from Goulds pumps in any kind of industrial application. Goulds engineers have a background of knowledge and experience gained through 106 years of pump manufacturing. They are ready to help you select the pump that meets your specific requirements, or to consult with you on any pumping problem. Your inquiry will be welcome.



Cross-section of Goulds 2-stage Fig. 3390 pump, showing impellers opposed for hydraulic balance, and other important features of construction. For additional information ask for Bulletin 722.3.

MEMBER HYDRAULIC INSTITUTE U.S.A.

Goulds PUMPS INC. Seneca Falls New York

ATLANTA • BOSTON • CHICAGO • HOUSTON • NEW YORK • PHILADELPHIA PITTSBURGH • TULSA

For more facts circle 549 on Reply Card

OPERATION — PRODUCTION

(O and P begins on page 52)

and the table turns freely when the spring winding machine is in operation. Tilting in two directions, the table is supported on a telescoping stand, for variable heights. A spring steel brake assures tension on the wire at all times.

In addition to its suitability for use with any type of winding machine or wire-feed production machine, the wire-holder can also be used to advantage with several types of metallizing guns, to feed welding wire into the gun.

Wear Stone Lasts Longer

Photo: John A. Roebling's Sons Corp.

Movement of hot semi-scaled steel wire through pickling bath necessitated frequent renewal of wear stone until silicon carbide stone (arrow) made by Carborundum Co. was used. Stone has been in service for six months, shows no wear

Larger Lamps Save Electricity

Contributed by J. R. Patrick

LIGHTING ECONOMY begins with an efficient maintenance program to keep fixtures clean and sparkling for maximum illumination release. However, the economical use of lamp bulb sizes is often overlooked in actual practice and design.

Decorative light fixtures are definite-

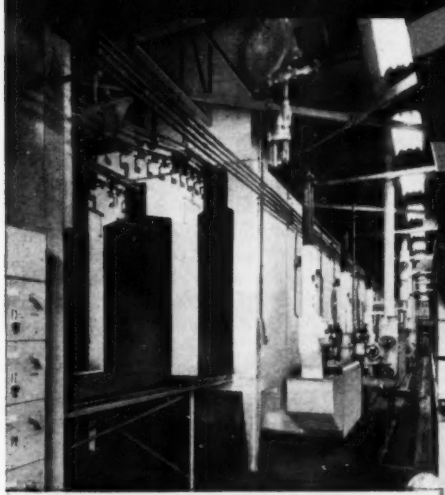
OPERATING DATA ON 120-V LAMPS

Watts	Bulb Size	Normal Amps	Initial Lumens	Lumens per Watt
25	A-19	0.21	260	10.4
40	A-19	0.34	465	11.7
60	A-19	0.50	835	13.9
100	A-21	0.83	1,630	16.3
150	PS-25	1.25	2,600	17.2
200	PS-30	1.67	3,650	18.3
300	PS-25	2.50	5,900	19.6
500	PS-40	4.17	9,950	19.9
1000	PS-52	8.3	21,500	21.5
1500	PS-52	12.5	33,000	22.0
2000	PS-52	16.7	44,000	22.0

Table shows lamp lumen output values

COMPLETE *Finishing* SYSTEMS

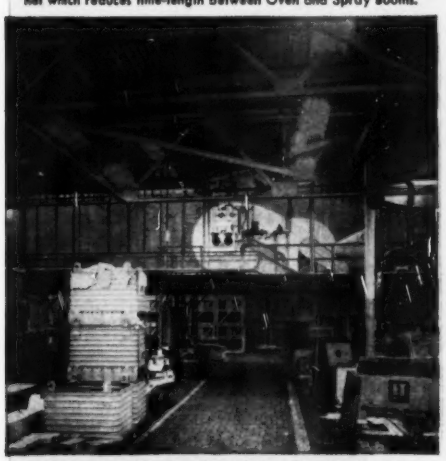
. . . for ENAMELS • LACQUER • PAINT • VARNISH



Exit end of Mahon Five-Stage Metal Cleaning and Rust Proofing Machine. Note two parallel conveyor lines pass through this unit.

. . . the EXPERIENCE that goes into the PLANNING and ENGINEERING of MAHON EQUIPMENT is the item of GREATEST VALUE to YOU!

Mahon Dry-Off Oven and entrance end of Mahon Cooling Tunnel which reduces time-length between Oven and Spray Booths.



The Mahon Direct Gas-Fired Finish Baking Oven in this installation is located overhead to permit 100% use of floor space below.

Mahon Hydro-Filter Spray Booths with modern "HYDRAIRE" Flood Sheets are staggered right and left hand to permit spraying on opposite sides of parts without turning.

More RESIDENTIAL HEATING UNITS Receive Their FINE FINISH in a COMPLETE MAHON FINISHING SYSTEM!

Here is another Complete Mahon Finishing System designed, built and installed to produce specific results on a particular product. The system is ultra-modern in every respect . . . it includes a two-conveyor line five-stage Metal Cleaning and Rust Proofing Machine, a Dry-Off Oven, a Cooling Tunnel, two Hydro-Filter Spray Booths, and an overhead Finish Baking Oven which permits use of the floor space below. Direct Gas-Fired Units provide the heat for both Dry-Off and Finish Baking Ovens. Temperature control is automatic throughout. If you have a finishing problem, or are contemplating new finishing equipment, you, like many other alert manufacturers, will find that Mahon engineers are better qualified to advise you on both methods and equipment requirements . . . and better qualified to do the all-important planning, coordinating and engineering of equipment—which is the key to fine finishes at minimum cost. You will also find that Mahon equipment is built better for more economical operation over a longer period of time—this is an important factor which should be carefully considered when comparing initial cost figures. Mahon's thirty-two years of experience in this highly specialized field covers thousands of Complete Finishing Systems including Dip, Flow Coating, and Spray Equipment for every conceivable product painted on a production basis. See Sweet's Plant Engineering File for complete information, or write for Catalog A-654.

THE R. C. MAHON COMPANY

HOME OFFICE and PLANT, Detroit 34, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling, and Rust Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems and Drying and Baking Ovens, Cooling Tunnels, Heat Treating and Quenching Equipment for Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

For more facts circle 550 on Reply Card

FOR FUME AND DUST REMOVAL

SPIRATUBE®

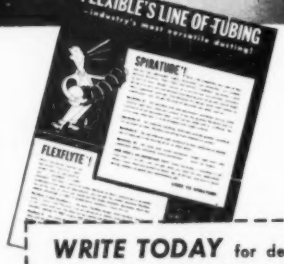
gets closer-in!

For blowing, exhausting, and light materials handling, Spiratube is proving itself *superior to costlier types of ducting*... because it bends at any point, takes tight turns up to 180°, and needs no special fittings for snaking around obstructions.

Made of galvanized steel wire helix which is secured in place between overlapping plies of various specially coated fabrics, this new, lightweight, flexible ducting connects quickly and easily to permanent or portable lines.

Standard sizes for all requirements are immediately available from well-stocked distributors—coast-to-coast.

SPIRATUBE is used by Todd Shipyards Corporation for removing welding fumes during ship construction and repair at its two plants in New York Harbor.



Flexible Tubing CORPORATION

Guilford, Connecticut Pasadena 1, California

WRITE TODAY for details on Flexible's full line of amazing cost-saving ducting.

For more facts circle 551 on Reply Card

OPERATION—PRODUCTION

(O and P begins on page 52)

ly out of place in large shop areas, but many plants still use power-wasting clusters of small bulbs.

Checking a lamp table shows that a cluster of three 100-watt lamps produces 4,890 lumens at 2.49 amps. Yet, with practically the same current, 2.5 amps, one 300 watt lamp gives 5,900 lumens, or 20 per cent more light.

Similarly, one 100-watt lamp draws 17 per cent less power and furnishes almost equal illumination to two 60-watt lamps.

Replacing smaller lamps with larger sizes means lower installation, replacement and maintenance costs, less handling and decreased lighting cost.

Paint Roller Applies Neoprene

A FAST NEW METHOD of applying chemically resistant finishes with paint rollers has been developed by Gates Engineering Co., for use in their applications of neoprene coatings.

Gates has found that the use of Dynel, a synthetic fiber produced by Union Carbide & Carbon Corp., as covering for the paint rollers, cuts application time but at the same time gives better coverage.

The new paint rollers are made with a plastic core, on which is permanently bonded the Dynel cover fabric. They are chemically resistant, lightweight, long-wearing and easy to clean. Although other types of rollers have proven ineffective in working with the neoprene coatings in liquid suspension, the combination of Dynel with the plastic core handles the job.

Worker applies neoprene suspension coating to piping elbow with paint roller

IT WORKS WONDERS IN MATERIALS HANDLING-

300 to 400% increase in efficiency

75% decrease in handling costs

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers... All Designs... All Sizes

With the Dempster-Dumpster System, one truck-mounted Dempster-Dumpster accomplishes more than several conventional dump trucks. You eliminate trucks standing idle. You eliminate re-handling of materials. You eliminate loading crews. You increase efficiency, sanitation and good plantkeeping with this Dempster-Dumpster System—the lowest cost method of bulk materials handling ever devised.

It's like having one truck with scores of bodies. One truck-mounted Dempster-Dumpster serves scores of detachable containers built in capacities up to 15 cu. yds. Each is designed to suit the materials to be handled—be they solids, liquids, dust, bulky, light or heavy. You simply place these containers at convenient materials accumulation points outside or inside buildings. As each is loaded, it is picked up, hauled and dumped (or load set down intact). Entire operation is handled by hydraulic controls in cab by only one man, the driver.

The list of manufacturers using the Dempster-Dumpster equipment reads like the "Who's Who Among the Nation's Leading Manufacturers". We mention this simply to point out that dozens of the nation's oldest and most successful firms use the Dempster-Dumpster System because of its efficiency and tremendous savings. Write to us now for complete information. Manufactured exclusively by Dempster Brothers, Inc.

Representatives in principal cities throughout the United States, Canada and foreign countries. There's one near by to serve you promptly.

DEMPSTER BROTHERS, 184 SHEA BLDG., KNOXVILLE 17, TENNESSEE

For more facts circle 552 on Reply Card

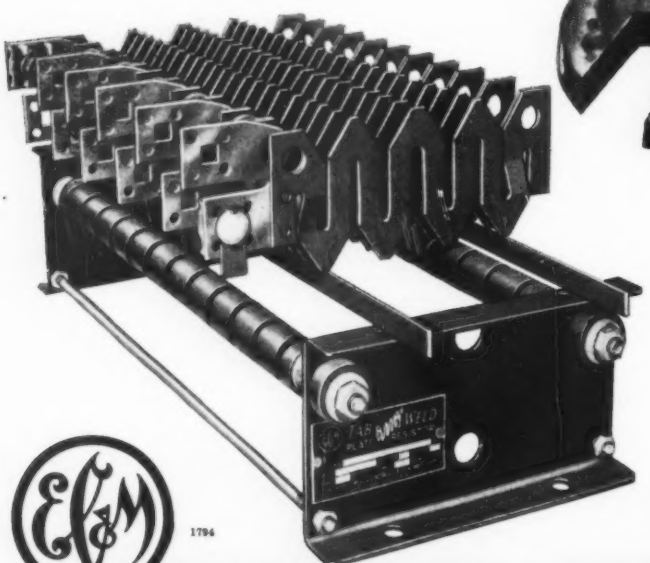
Hands Off!

EC&M TAB-WELD RESISTORS REQUIRE MINIMUM MAINTENANCE

Only EC&M TAB-WELD Plate Resistors are both bolted and welded for constant current path. Unlike other resistors, they do not require periodic tightening of clamping nuts to compensate for loss of pressure caused by alternate heating and cooling. In TAB-WELD Resistors, grids are offset and mating ends spot welded. Tap-plates are also welded into place at close intervals along the grid assembly.

This exclusive EC&M construction offers these outstanding advantages: (1) stabilized ohmic value, (2) no burning at grid-eyes or at tap-plates, (3) easy tap-shifting for best motor performance, and (4) long life with negligible service.

So . . . hands off EC&M TAB-WELD Plate Resistors . . . they are constructed for dependable performance on heavy duty motor applications . . . with minimum maintenance!



1794

CHECK THESE ADVANTAGES!

- Nonbreakable
- Corrosion-resistant alloy steel
- Negligible resistance change between cold and maximum working temperatures
- Offset resistor ends spot-welded
- No burning at grid eyes
- No burning at taps
- Small adjustments in resistance value easily made
- Insulating spacers remain dimensionally stable
- No periodic tightening of clamping nuts
- All standard sections same size
- Double insulation to ground
- Fast connection to any tap plate

Write today for illustrated Bulletin No. 942-B for complete data on EC&M TAB-WELD Resistors.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

For more facts circle 553 on Reply Card

HALL INDUSTRIAL WATER REPORT

Hall Laboratories, Inc.—A Subsidiary of Hagan Corporation, Pittsburgh, Pa.

Volume 2 | AUGUST 1954 | Number 4

Investigation from the Ground Up

A recent experience in a large utility plant took Hall Service engineer R. G. Hobek from the basement to the roof to investigate the connection between contaminated boiler water and a peculiar odor that was permeating the entire building.

The No. 2 unit of this plant is rated at 700,000 pounds per hour and is operated at 1500 pounds per square inch. Favorable operating conditions in the equipment at this power station are scrupulously maintained, so the plant men were disturbed when an unusual color showed up in water samples drawn from this boiler. At about the same time, a heavy odor became noticeable throughout the plant.

Mr. Hobek reports:

"We noted the heavy, sweet, organic odor as soon as we entered the building. When the boiler water was checked, it was found to contain a yellowish, well-dispersed material that would not settle, and could not be removed by ordinary filtration.

"We started our examination of the system at the condenser vacuum pump vent line in the basement where the odor was first noted. We followed the line to the roof where it exhausted. In observing the vent lines from the No. 1 and No. 2 units, we saw that the exhaust from the No. 1 unit rose directly to atmosphere while that from the No. 2 unit appeared to be heavier than air and seemed to flow down the outside of the vent line. We climbed to the roof and found that the odor of this heavy exhaust was the same as in the plant. An oily film coated the outside of the vent line.

"The ventilator intake for the plant is located about 50 feet from the vent lines. The fumes were being picked up here and carried throughout the plant.

"We suspected at this point that oil contamination would show up in the condensate and a sample was collected. Analysis of the sample confirmed our suspicion, and investigation by plant personnel showed that a broken weld on the turbine bearing oil return line had admitted from fifty to one hundred gallons of oil to the system."

Cleaning the oil from the system was a big job, but the early solution of the problem prevented real damage.

Waste Water Can Be Costly

Two recent civil suits could have been avoided by proper disposal of waste materials. The outlay for damages and court costs took these plants "off the hook" legally but did not solve their problems.

One plant dumped a water and molasses mixture into a ditch from which it seeped into a well supplying drinking water. The Supreme Court of the state upheld a substantial judgment against the plant, commenting ". . . one who by permitting pollution contaminates the underground water supply of his neighbor's well or spring, commits an act for which he may be required to respond in damages."

Another plant dumped water saturated with a mixture of dirt, chalk and chemicals into a stream. In sustaining an injunction against the continuance of this practice the Supreme Court of this state said, "The principle is that while water is on the land it belongs to the owner of the land, yet he cannot so use and adulterate it as to interfere with the enjoyment thereof by the next owner and if he does so, he is liable in damages for so using it."

Plant-wide Survey Pays Off

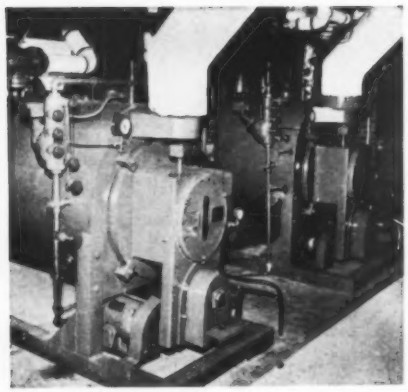
The cooling of precious metal bushings presented a critical problem for production and maintenance engineers in a fiber glass plant. Make-up to the open recirculating cooling system was untreated well water; the high "skin" temperatures encountered in the cooling system aggravated the corrosive and scale-forming properties of this water. Plugging of the restricted cooling channels, resulting in overheating of bushings, was a daily occurrence. Aside from production losses, damage to the bushings was often so extensive that recasting was not possible. New bushings cost several thousand dollars apiece.

A plant-wide water survey by Hall engineer W. J. Reese showed the cooling problem to be sufficiently critical to justify split stream softening followed by treatment with a few ppm of glassy phosphate at a controlled pH. Since adopting this recommendation, the plant has operated continuously for two years without one instance of bushing failure resulting from overheating; this service record exceeds the calculated life expectancy of the precious metal bushings by many times. Probably the life expectancy of the Plant Engineer has also been materially improved.

Industrial Water Problems Require Special Handling

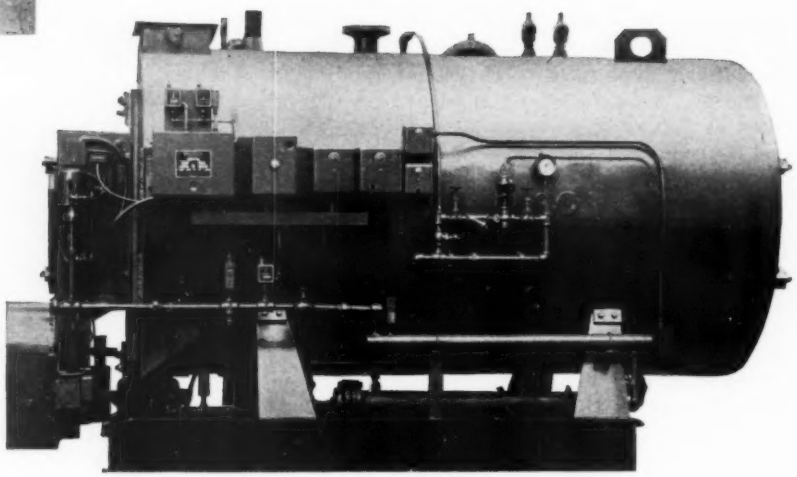
There are no "stock answers" to industrial water problems. For information, write, wire or call Hall Laboratories, Inc., Hagan Building, Pittsburgh 30, Pa.

Water is your industry's most important raw material. Use it wisely.



LOW COST STEAM
with the Continental "Packaged Boiler"

84.08% full load boiler efficiency... 99.77% dry steam reported by engineering firm



A consulting engineering firm conducted a test on a 150 hp Continental Automatic Boiler firing Bunker C Fuel Oil, under simulated field operating conditions in accordance with the A.S.M.E. boiler test code. The results give proof as to why Continental Boilers afford high steam quality and low fuel costs. As the test showed: steam quality was 99.77% dry ... full load boiler efficiency was 84.08% ... and stack temperature was considerably less than 100 degrees (F.) above steam temperature.

The consistently high efficiency and low stack temperature of the Continental Boiler are due mainly to ample heating surface, thorough mixing of atomized fuel and air, and the spinning gas technique.

Spinning Gas Technique

Continental's spinning gas technique retards the passage of hot gases through the furnace and return tubes – thus affording an exceptionally high rate of heat transfer ... high boiler efficiency ... and low stack temperature.

With the Continental, efficiency over 80% is *guaranteed* ... and stack temperature is *guaranteed* not to exceed 125 degrees (F.) above saturated steam temperature at operating pressure.

Continental Automatic Packaged Boilers range from 20 to 500 hp; 15 to 200 lbs. W.P.

Write for new Bulletins BE3, BE4 and a copy of the boiler test report.

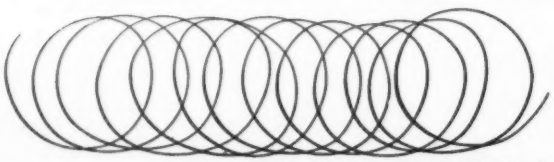
Bulletin BE3 ... tells what to look for when you select a packaged boiler.

Bulletin BE4 ... describes the Continental's Spinning Gas Technique.

Continental Boiler Division
BOILER ENGINEERING & SUPPLY CO., Inc.
Phoenixville, Pennsylvania

40 years of boiler manufacturing experience

Continental is sold, installed and serviced by competent distributors throughout the U.S.



... the boiler with the Spinning Gas Technique

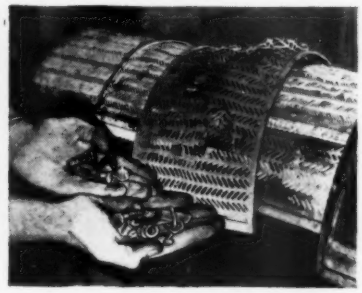
For more facts circle 555 on Reply Card

Product Contamination, Fires, Machinery Damage Stopped By New ERIEZ Grate & Hopper Magnets

Mill operators are shown pouring lump color pigments onto the Eriez grate magnet installed at the top of a "Mikro" pulverizer mill. The magnet is 32½" long by 32" wide.

All non-magnetic material is carefully brushed off the grate magnet since the accuracy of the color match requires every bit of the pigment. Later the grate is cleaned of its tramp iron load by lifting the grill.

Operator is shown regulating the flow of chrome yellow pigment so that it flows over, around and through the steel discs of the hopper magnet.



Damaged screens form the background in this view made in the testing and blending laboratory of the Kentucky Color and Chemical Co., Inc., Louisville, Ky.

EIGHT ERIEZ GRATE AND HOPPER MAGNETS SAVE KENTUCKY COLOR & CHEMICAL CO. $6,000 ANNUALLY!

On April 30, 1953, the Kentucky Color & Chemical Company installed in a pulverizing mill its first grate and hopper magnet, one of the latest developments of the Eriez Manufacturing Company, Erie, Pa., to fight the particles of rust, large bolts and scraps of iron that create production problems in chemical and food processing lines.

Mr. J. D. Todd, Vice President and General Manager of the Kentucky Color and Chemical Company reports, "The eight grate and hopper magnets now installed in our plant have succeeded in reducing product contamination from ferrous matter to the vanishing point. We estimate annual savings for mills, in terms of damage to equipment, time lost in repairs, loss of production time and fire losses at $6,000. We feel so strongly about the excellent ferrous separation job the Eriez magnets are doing for us that we are installing them in all our mills."

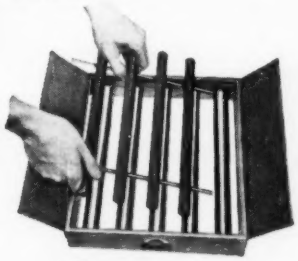
A recent industrial survey established Eriez as the preferred magnets in the chemical field.

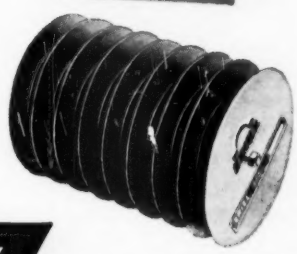
NEW PERMANENT MAGNETS offer protection to food and chemical processing lines never before possible regardless of space limitations...and they give new efficiency in stopping tramp iron costs.

THE ERIEZ GRATE MAGNET is available in *162* standard sizes to give you the ultimate efficiency in hoppers, floor openings, vertical shafts, etc. Removable top grill acts as a baffle, slows passing food or chemicals and directs the material onto the magnetic tubes. These tubes, containing powerful ALNICO V castings, pull out and hold the iron. All units can be furnished entirely of stainless steel.

THE ERIEZ HOPPER MAGNET can be built to the exact length desired and placed in the throat of any wood or steel hopper. Steel step-discs pull and hold any tramp iron from free flowing material, wet or dry. Can be adapted to steeply sloping hoppers where other magnets, with physical or dimensional drawbacks, can't be fitted.

These self-contained units are simple to install. Easy to maintain. No electric current. No wires. Your first cost is the last cost. Bulletin available giving full information.





NOW! FROM ERIEZ, PIONEERS OF MAGNETIC EQUIPMENT . . .
THE "MAGNALARM", A MAGNETIC SEPARATOR WITH A BRAIN!

Here is what the industry has been waiting for! The "Magnalarm", just developed by Eriez, is a permanent magnetic separator with a built-in "brain" that signals you automatically when a predetermined amount of tramp iron is caught by the separator. The alarm signal can consist of a light going on . . . or a bell ringing . . . or can shut down your machinery! Here is the maximum insurance against the danger presented when the separator is neglected by maintenance men . . . or is in a difficult position . . . or catches an unforeseen amount of tramp iron. The problem posed by the fact that any magnet temporarily loses part of its "pull" when covered with tramp iron is now solved. The "Magnalarm", with its ferrometer brain, tells you when your magnet reaches the minimum efficiency. You rest secure in the knowledge that your magnetic separator is *always* on guard . . . protecting you from an overflow of tramp iron that can result in expensive fires, machinery damage and product contamination. The cost? Only a little more than a regular magnetic separator. Simple to install. *Write for the free bulletin.* You'll agree on reading all the details that the "Magnalarm" is the most revolutionary forward step in magnets since Eriez introduced the non-electric permanent-type magnet!

ERIEZ MAGNETS

ERIEZ MANUFACTURING COMPANY 71H Magnet Drive, Erie, Pa.

Please send me:

Eriez Grate & Hopper Bulletin _____ ☐

Eriez Magnalarm Bulletin _____ ☐

ERIEZ

Name.....

Address.....

Company..... Title.....

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FROM START TO STEAM...

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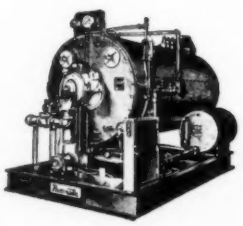

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COURT DECISIONS — a summary of legal findings of interest to the plant engineer

Prepared by Albert Woodruff Gray

Lawful Business Not A Nuisance

Criminal charge was made against an electroplating plant in New York City that it was a public nuisance and that the noise created by the smoke stacks of this plant was unbearable.

An engineer employed in the plant asserted that the plant had been constructed in accordance with the latest scientific knowledge, that there was no better way in which these stacks could be erected and that, "There is no method now known to science under which these five smoke stacks could be maintained or operated other than the way in which they are."

In its dismissal of the charge against the owners of this plant of maintaining a public nuisance, the New York Court said,

"The business is a lawful one and under the authorities its operation may not be deemed to constitute a public nuisance unless something that is done in the operation of that business is unlawful or its operation is negligent or improper in some degree or respect.

"The business is lawful and for that reason its operation may not be held to constitute a public nuisance unless it appears that it is being operated improperly, negligently or in some manner unlawfully. No instance has been submitted to the court in which a plant operator has been found guilty in a criminal proceeding of maintaining a public nuisance where the business was lawfully conducted and where the resultant noise was the inevitable consequence of a proper operation of the plant."

Negligent Use Of Gasoline

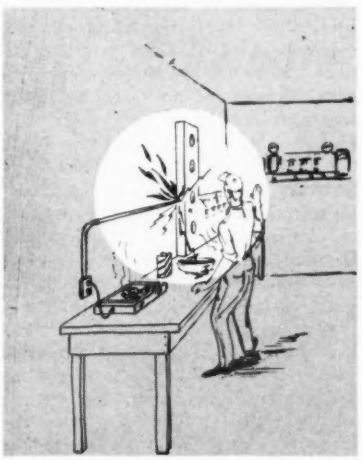
In a North Dakota machine shop devoted to the repair of tractor and tractor parts, a 12 ft test bench was placed against a wall of the shop. At the end of the bench was an L-shaped test panel containing various electrical equipment and immediately beyond the end of this bench several electrical switches and fuse boxes.

An electrically heated plate was installed on the bench for drying armature and field coils of motors and generators of any internal moisture. At the other end of this bench, from the switches and fuse boxes, was an arc-welder connected to a power wire strung against wall, above bench.

An employee cleaning a generator and motor, by washing the parts at this test bench in a half filled pan of gasoline, saw a fire at the end of the bench near the electric fuse boxes. The fire spread rapidly across the bench and before the employee could dispose of the pan of gasoline it ignited, burning the workman and spreading the fire that ultimately not only destroyed the shop but severely damaged the adjoining building.

At the trial of the action brought to recover for the damage to the adjoining property, this employee said:

"When I first noticed the fire I backed away from it after I caught



on fire. There seemed to be a wire on the wall and I could see smoke coming out like it was following something."

The Supreme Court of that state, absolving the machine shop owner from the charge of negligence made in this action, said, "Taking all of the facts into consideration, that the fire did not start at the pan of gasoline, that the fire was not a typical gasoline vapor fire in that there was no explosion or flash back to the pan and that smoke was coming out of the wall of the shop within a few seconds after the fire was noticed on the bench, we are satisfied that it was at least probable, if not more probable, that the fire was caused by a short circuit or some other unknown cause for which this owner has not been shown responsible, than that it was caused by negligent use of gasoline."

Parking Lot Liability

In a recent decision the Supreme Court of Ohio distinguished between the responsibility of a parking lot owner or proprietor for the injury or loss of parked cars and the responsibility of a mere licensor who permits a car owner to leave his car unattended on an open lot. The court said,

"The relationship between the operator of a parking lot and the operator of a motor vehicle who parks the vehicle in such parking lot depends upon whether the parking lot proprietor assumed control over and custody of such vehicle or simply grants permission to park such vehicle at a designated place upon the parking lot. If the parking lot proprietor assumed control over and custody of the vehicle the relationship thereby created is that of bailor and bailee.

"On the other hand if a designated place on a parking lot is assigned to the owner without any assumption of control over or custody of the vehicle by the operator of the lot the relationship would be that of lessor and lessee."

In an earlier decision by an Alabama court, to which reference was made in this instance, the court made this distinction,

"In order to constitute a bailment whereby the custodian of the car becomes responsible for its safekeeping, the custodian must have voluntarily assumed the custody and possession of the property of another. If that was not done the relationship was either that of a license or a lease. If there was only permission given, though for a reward, to park at a convenient place on the lot, with no assumption of dominion over the property or custody of it in any respect it was a license. If a designated place on the lot was assigned to the car owner for his exclusive use and no other, without assumption of dominion or custody of the car, the status was that of a lease.

"Usually the circumstances of each case control in determining what the status is, rather than an express agreement so designating it."

Insurance Company's Agent

Fire insurance policy covering merchandise, machinery, furniture and fixtures in an Oklahoma plant permitted the plant a fluctuating inventory with a monthly adjustment of a maximum coverage of $30,000.

Value reports were made by the plant to the agent of the insurance company. The policy provided that the plant should report its inventory to

COURT DECISIONS

the insurance company not later than 30 days from the last day of each calendar month and failing to do so the last report received by the company governed the coverage.

The amount of the inventory had been furnished the agent of the insurance company but had not been reported by him when a fire occurred. The insurance company contended in its defense to the action to recover under this policy that the plant had failed to make these reports and the insurance company was consequently bound by the latest report it had received from its agent.

The Federal appellate court in holding the insurance company not only bound by whatever information had been furnished its agent but that it had waived its requirement of regular monthly reports of inventory, said,

"The question was whether the liability of the company was to be determined by the value report prepared by the agent from information obtained from the assured and actually received by the company before the loss by fire or determined by the last report prepared by the agent on information furnished to him by the insured but not transmitted to the company until after the fire.

"The insurance agent, within the general scope of the business he transacted, was the insurance company; what he knew the insurance company knew and what he did the insurance company did.

"When the question, whose agent he is, arises with respect to the conflict of interest the law will not hold the insured for the act or omission of a general agent who under the scope of the actual or apparent authority of the insurer leads the insured to believe that what he has done in relationship to his policy amounts to a compliance."

Acknowledgment or Acceptance

In Kentucky a purchaser received a letter acknowledging an order for merchandise, "Your order is at hand and will receive our prompt and careful attention. Thanking you for the same and hoping to merit future favors."

In the suit brought later by this purchaser for the failure of the seller to ship the goods, the court held that there had been no agreement by the seller to do so, no acceptance of the order and hence, no contract.

"The response and the only response," said the court, "was an acknowledgment of the receipt of the order or proposal accompanied by the expression, 'the same shall have prompt attention,' and it is insisted that this response constituted an acceptance of the proposal, converting the proposal and acceptance into a contract of sale. Unless these words 'the same shall have prompt attention' are diverted from their natural and ordinary meaning they cannot be construed into an acceptance of the proposal of the purchaser, converting it into a concluded or completed contract.

"The operative words are 'attention' and 'prompt.' The letter when read in connection with the terms of the proposal signifies and was intended to signify no more than that attention would be given in time to meet these terms. If given within that time it was as speedy as the nature or necessities of the transaction required.

"Promise to give the proposal attention was not a promise of acceptance. It was not an assent to it. It was no more than a courteous promise to give it consideration and this we do not doubt in the sense in which it is generally if not universally employed in transactions of this character.

"Until an order is accepted it may be countermanded by the buyer. When it is once accepted it may not be countermanded by the buyer. When it is once accepted and the buyer's right to countermand is at an end, the seller cannot revoke the acceptance without the consent of the buyer. It is generally held that, if the seller does not formally accept the order it is subject to countermand until it is accepted by the shipment of the goods."

Damage From Truck Operation

The wall of a warehouse in Alabama was punctured for three and a half feet by the negligent backing of a

truck preparatory to loading. The owner of the truck asserted that the accident was caused by the carelessness of the warehouse owner in leaving a pile of rocks near the entrance so that the truck had to be "jack knifed" into the doorway. The truck owner also held that since the warehouse owner was negligent it barred a recovery from him.

A judgment against the truck owner for this damage was sustained by the appellate court, which said, "When injury is inflicted upon an owner upon his own premises it is not contributory negligence that he had not guarded his premises as perfectly against such injuries as prudence might reasonably dictate. This for the reason that the landowner may make a lawful use of his land and it is not negligent merely because he neglects to take precautions to avoid injury by others which can occur only as a result of another's negligence."

Acceptance of Portion of Goods

An order was given to a manufacturer for 20,000 ft of television cable at $150 a thousand feet, the cable to be in continuous lengths of not less than one thousand feet.

The order was filled by the manufacturer but after the purchaser had used approximately 13,000 ft it refused to pay for the remaining 7,000 ft contending that some lengths of this cable were less than a thousand feet and demanded that the manufacturer accept return of unused portion of this order.

The West Virginia court said in holding the purchaser liable for the entire shipment,

"A purchaser of personal property to avail himself of his right to be relieved from his obligation to pay for the purchased goods, either by a rejection of the subject of the sale for non-compliance with a condition thereof or by a rescission of the contract for fraud or other sufficient cause, must reject or return the entire property and thus place the seller as nearly as possible in his former position.

"Acceptance and retention of part of the property by the purchaser is a waiver of conditions, misrepresentations and fraud and binds him to payment of the whole of the purchase price subject to his right to an offset to the extent of the damages resulting from breach of warranties, if any.

"Under this hard and fast rule of the law of sales, relaxation of which public policy forbids in the interest of certainty and stability in commercial transactions, the evidence of conditions, misrepresentations, defects and unfitness which might have afforded ground for rejection or rescission, go for naught. All these rights are deemed by law to have been waived or abandoned by partial acceptance whether the purchaser actually intended to give them up or not."

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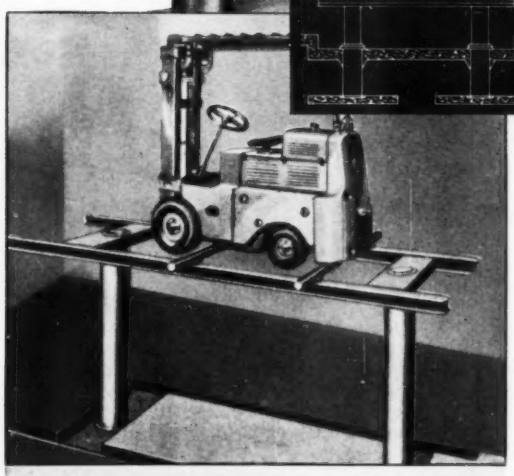

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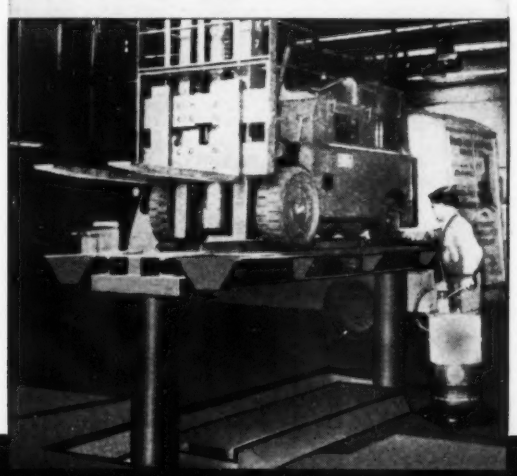

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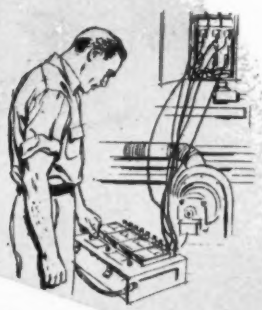

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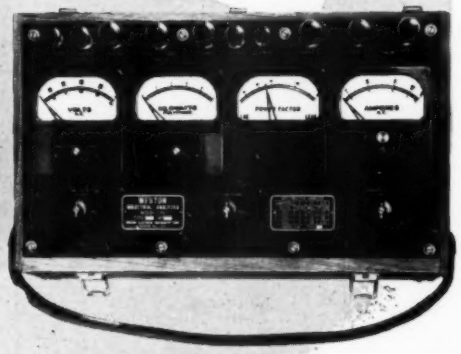

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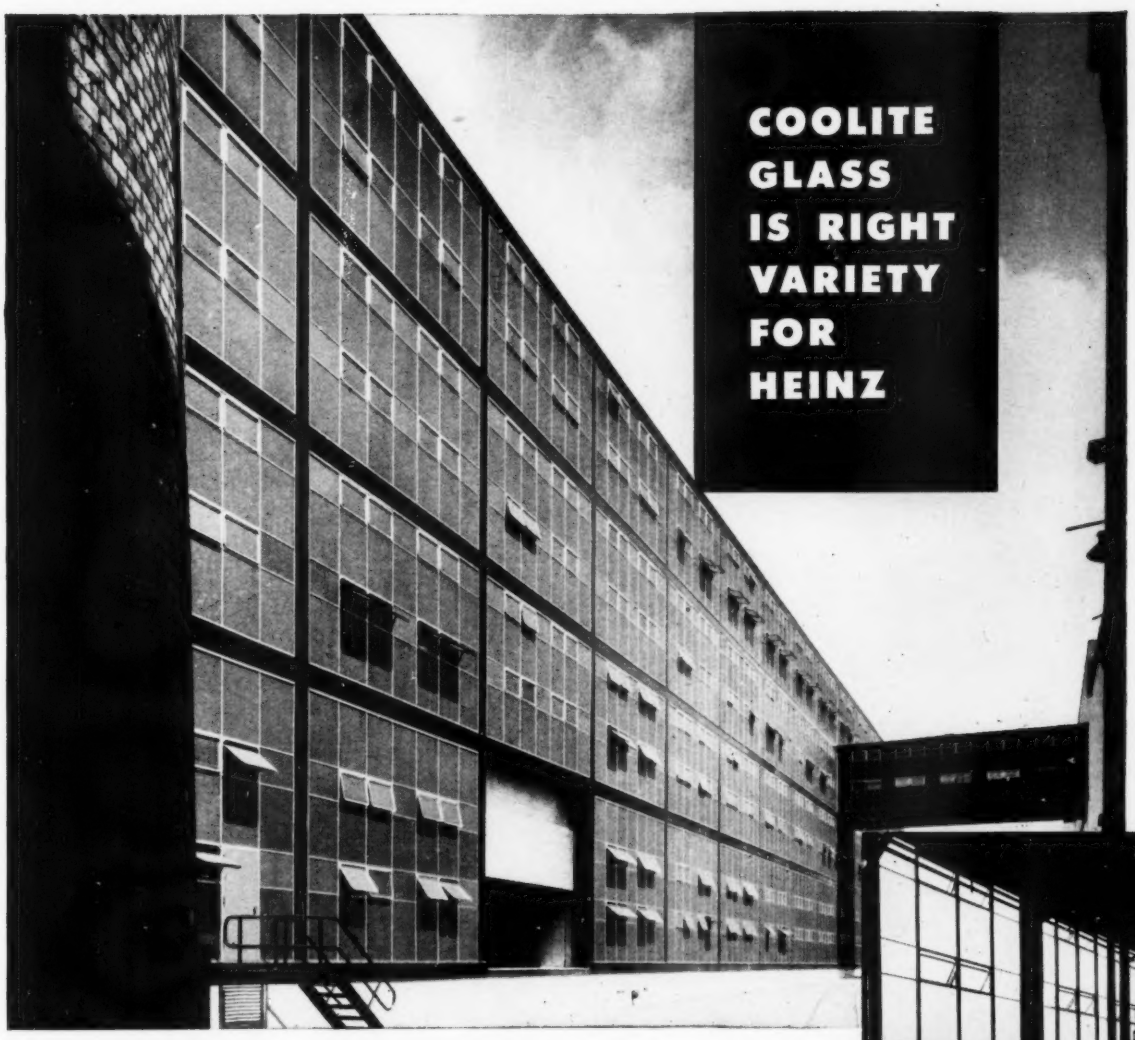

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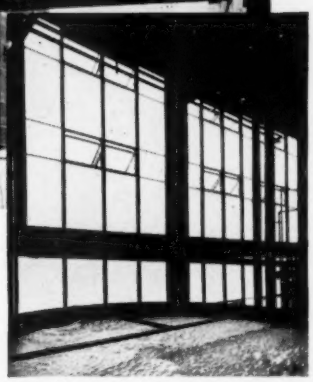

Coolite Glass combines beauty and utility in an exciting new variety of industrial architecture for H. J. Heinz Co. Ezra Stoller Photos.

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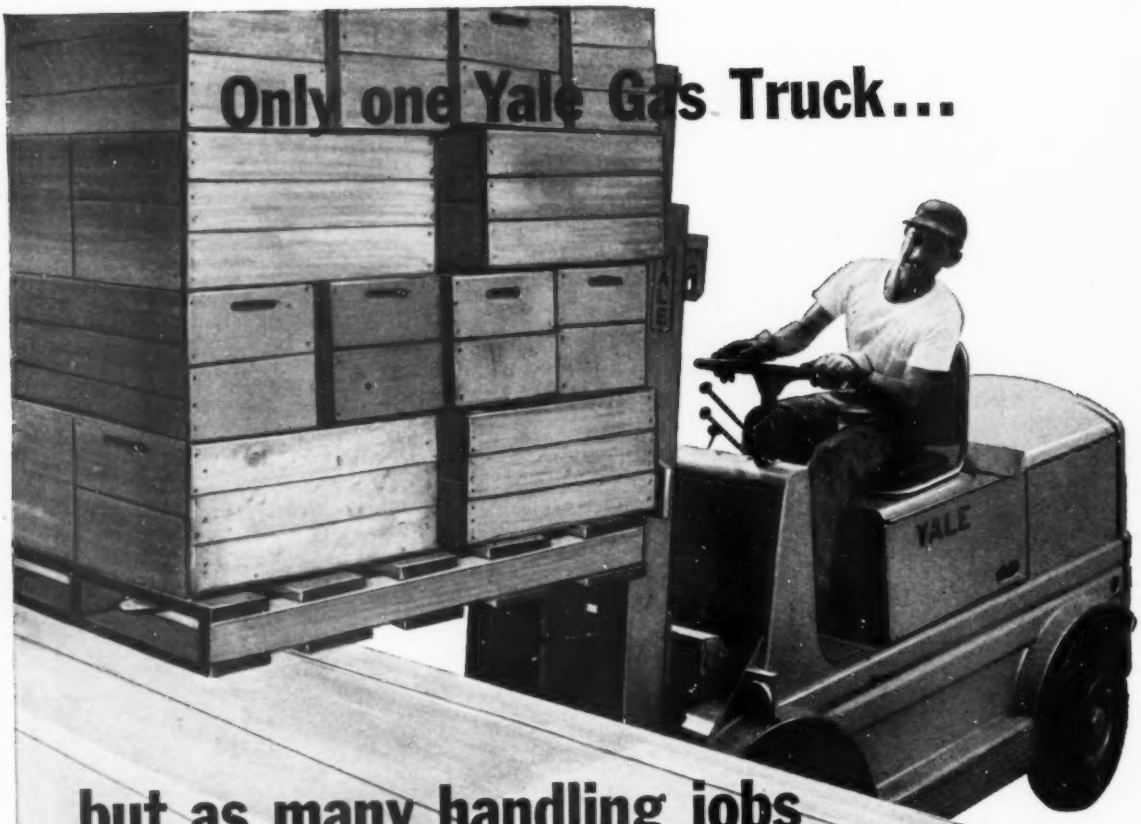

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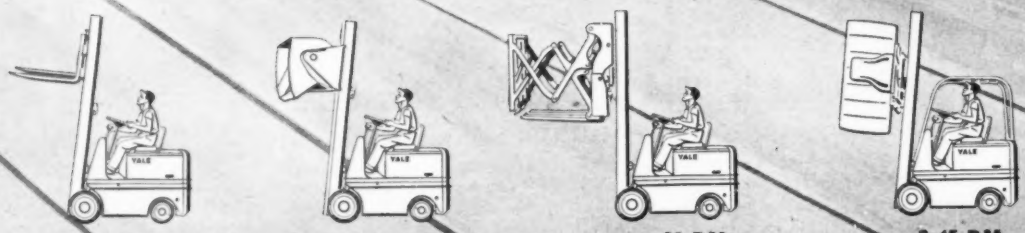

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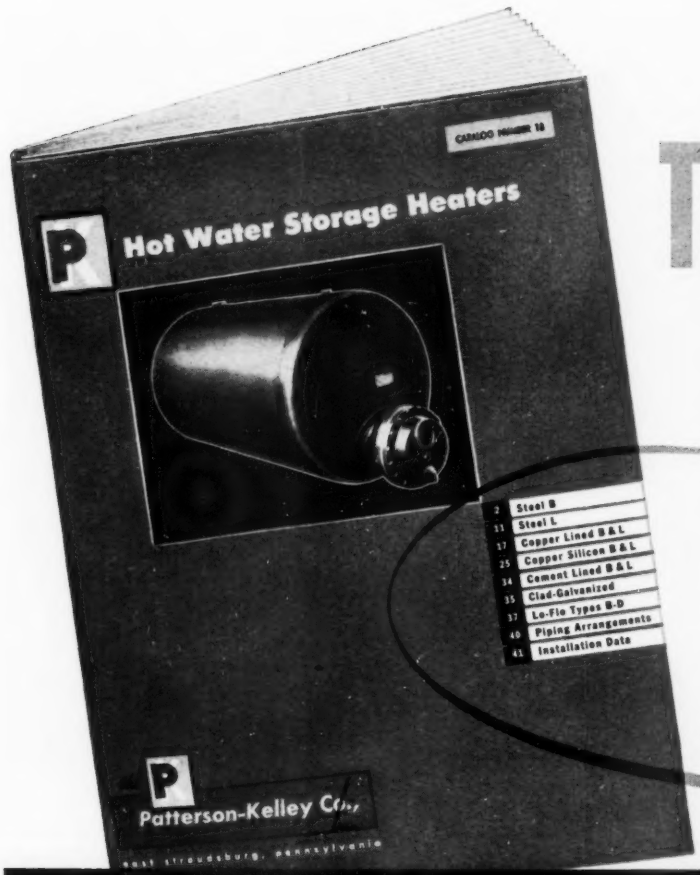

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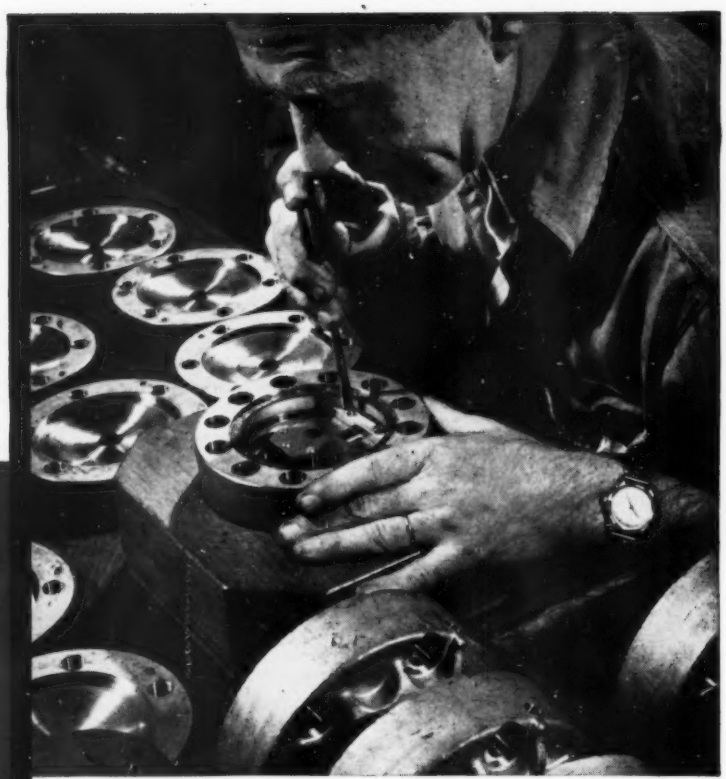

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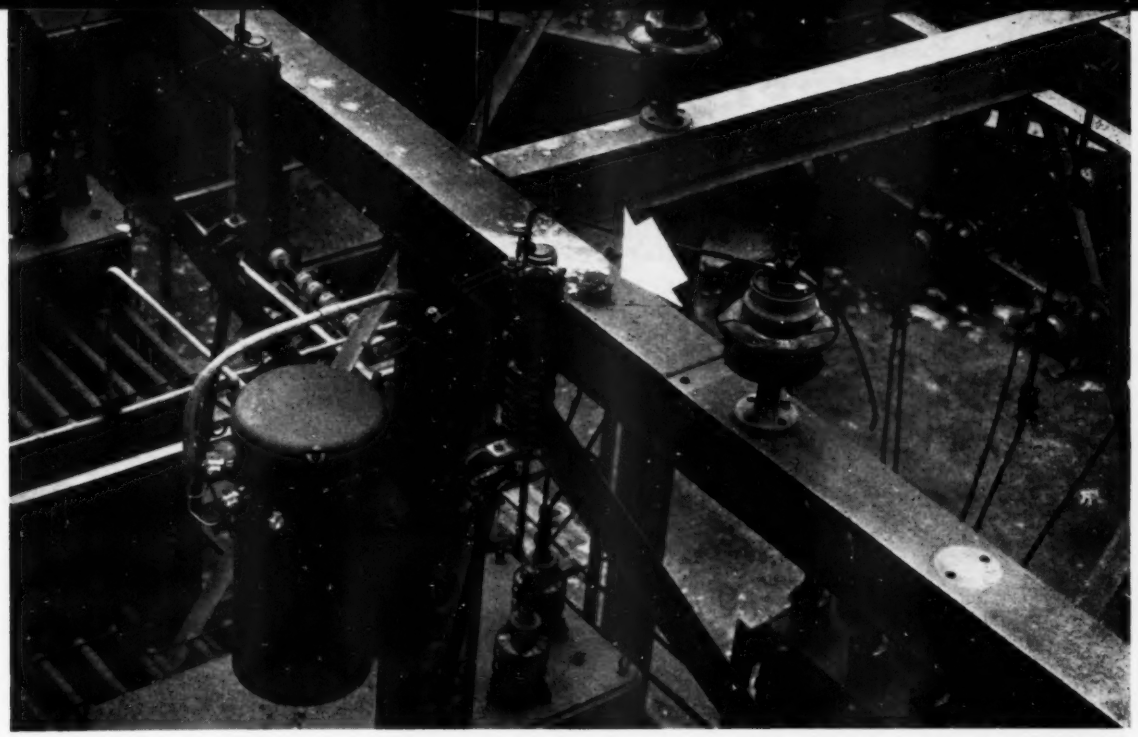


Arrows point to dried remains of one starling who gave up his life that succeeding generations might not fry while spry

One for the Birds—
Ornithology Enters Switchgear Design

Here's a blow-by-blow account of a one-bird invasion of a plant's switchgear related by a reader who prefers to remain anonymous . . . One specification at this plant will now read differently — but will measurements now include sparrows or storks? That's the big question

WE HAVE A 13.8 kv switching station outside the power plant. It contains oil circuit breakers for the four unit substations at the main plant and the two lines that go to the other plant. The generator breaker for the 10,000 kva turbine is a'so in this yard, and we put a lot of thought on ground relay protection for the Y-connected big generator and the various service and step-up transformers on the other turbines.

We had also made an honest effort to time out the relays at the other plants that take power from the 13.8 kv lines.

At any rate, just recently, a starling lit on the steel work and happily hopped down the steel to just under a lead going to a 13.8 kv potential transformer with a fuse cutout mounted ahead of it. The clearance from this wire to the steel is fully ample as long as it is full of air, but when the air contains a bird it isn't enough.

We had a phase-to-ground arc-over from the wire to the steel. This burned the instrument lead in two and the arc went phase-to-phase on the other instrument transformer lead. At the time we had the 10,000, 3,500 and 3,000 kw turbines on at the main plant, the 1,500 kw on at the Finishing Mill, and one 1,000 at the Weaving Mill.

The ground relay operated to knock all the main turbines off the line and there went 16,500 kw of generator. The governors all held and not a single machine went out overspeed. This dumped a load on the 1,000 kw and 1,500 kw that were still on the line and their line breakers cleared and the turbines held onto the inside-plant load at both locations. The relay targets at the Finishing and the Weaving Mill showed that both units went out on a phase-to-phase line short and the instantaneous targets came up.

There was only one arc, damage was confined to vaporizing about 4 ft of ⅛ in. copper rod, and we could have started up immediately but waited until we could cut all the damaged conductor clear and take a look at the insulators around the flash, which were not damaged. The important part is that the relays that have been tested for sequence operated as they should and the two small turbines held onto the inside-plant load some of which involves processing that ruins a lot of goods if power fails.

Thought other readers of PLANT ENGINEERING might enjoy this yarn and understand what we mean when we say our future switching station specifications will contain a clause saying that striking distance from live busses to grounded steel work shall be ample to include sufficient air and this one bird. This clause will give only one trouble — the corpus delicti we found was a starling—and one should examine the kind of birds available to decrease striking distance before setting these distances in inches. Thus ornithology comes into switchgear design and we will probably be all right unless starlings get bigger or we get infested with pigeons.

WATER WELL CLEANING With Glassy Phosphates

By **GEORGE NEWMAN** and **ARTHUR F. BROWN**, Utilities Department
Steubenville Works, Wheeling Steel Corporation, Steubenville, Ohio

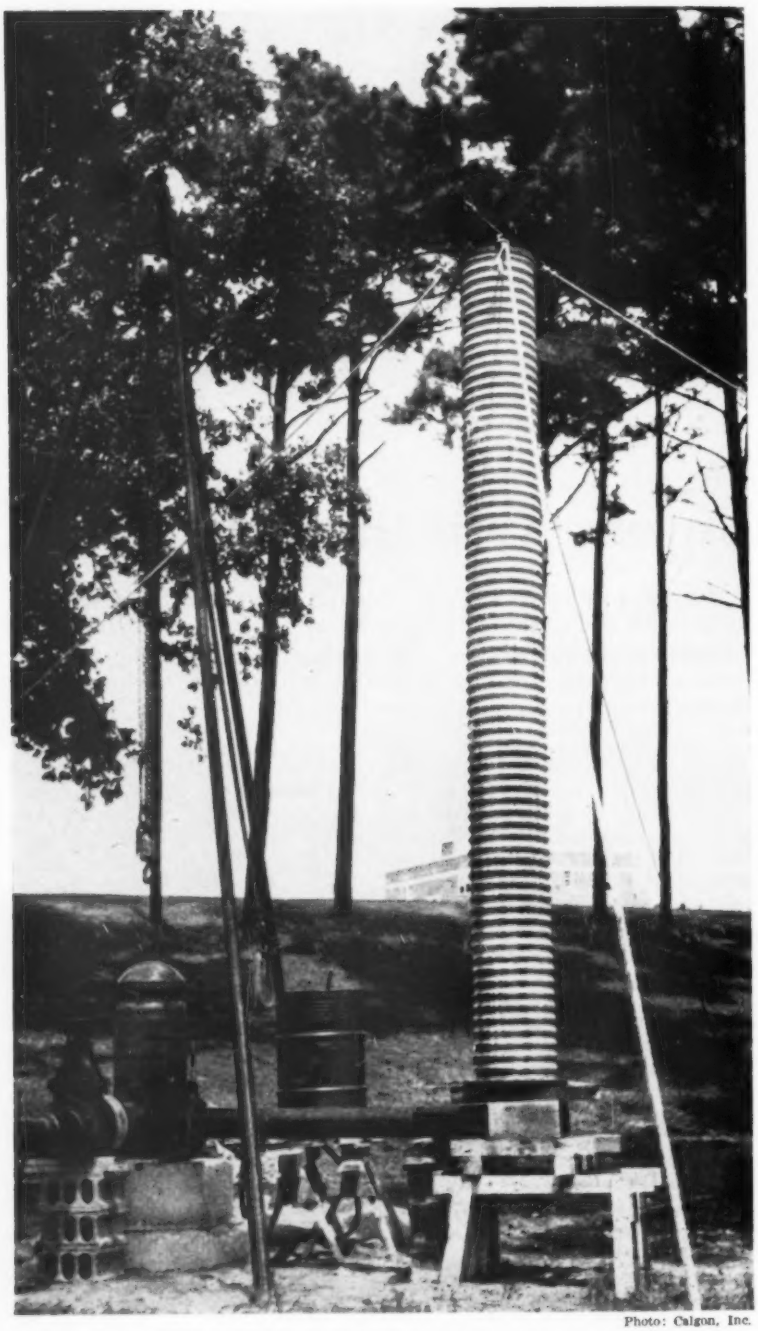


Photo: Calgon, Inc.

Fig. 1. Typical set-up for introduction of glassy phosphate to water well. This photo was not taken at site of Wheeling Steel Corporation's water wells

Increasing production, hampered by reduced flow from wells, was the undesirable situation facing this steel company... Agitation alone proved unequal to the task of increasing the flow appreciably, but the use of glassy phosphate more than doubled rate of production

CLEANING METHOD for porous concrete water well screens using glassy phosphate has been under experimentation at our Steubenville Works, Coke Plant, since May 1953.

Not too many years ago, the production loss of water wells usually meant the abandoning of the wells. The wells that fell off in production left the owner or operator the choice of curtailing the use of water as far as possible, or drilling new wells at considerable expense. The Coke Plant of Wheeling Steel Corporation, Steubenville Works, was, like many other plants increasing coke production by rebuilding and repairing the existing coke oven batteries and building additional ovens and by-product equipment to meet the ever increasing demand for steel.

Wells Producing at Reduced Rate

Therefore, Wheeling Steel Corporation was very much concerned with its present water supply. Nine of our wells were producing at a reduced rate, due to plugged screens and sediment in the gravel around the screens. It was decided to try a treatment of glassy phosphate and calcium hypochlorite after water samples were taken and checks made in our laboratory to identify the type of material found in several of our wells.

The wells discussed in this article are located along the Ohio River, on the West Virginia side and parallel to the harbor line. The distance between wells is approximately 300 ft, with the exception of two wells, which are approximately 750 ft apart. The wells are from 50 to 100 ft from the

river bank at normal river stage. All types of strata, clay, sand, and fine and coarse gravel were encountered in drilling for these wells. Because the wells are near the river a close check on the water table, production and river stage is made when checks are being made on the wells. During the time the treating program was being carried on the pool stage of the river was nearly constant.

Wells treated were in service from 6 years to 23 years prior to treatment, as shown on production graph, Fig. 5. The first well selected for the glassy phosphate treatment was No. 8 well.

Treatment of No. 8 Well

Number 8 well was drilled January 1, 1940 and produced 1620 gpm on test pumping with a static level of 34.3 ft. The well was put in service July 24, 1940 with a production of 1213 gpm on the line. By July 8, 1948 production had dropped to less than 500 gpm with a static level of 44 ft. The well was removed from service until April 13, 1951, when it was cleaned with muriatic acid and an inhibitor. A new screen liner was installed at this time and repairs were made to the pump. The well was again placed in service with a production of 610 gpm. Production declined steadily and the well was removed from service June 30, 1952, as production did not warrant operation of the pump.

In May, 1953, Number 8 well was treated with a glassy phosphate and calcium hypochlorite solution, the latter to kill the bacteria and other organic growths found to be present in our wells. Prior to this treatment however, it was found that agitation alone increased to some extent production from the well. This seemed logical because the sediment entrained in drawn samples showed calcium and magnesium.

Agitation, before treatment, was accomplished by back flushing the well approximately twenty times over a half hour period and discharging the water to the river. A wooden trough for disposal of flushing water enabled us to isolate the well from the service system, Fig. 2. Agitation alone resulted in an increase in production of 110 gpm. Although production was increased by agitation, recovery of the well was not improved as indicated by an excessive draw-down of 11½ ft with a flow of 430 gpm. See Fig. 3.

Although the above increase was experienced, it was noted that the water clarified very quickly. In other words, all we had done was loosen deposits from the concrete screen. A tank containing 450 lb of glassy phosphate, dissolved in water, was connected to the pump to permit the

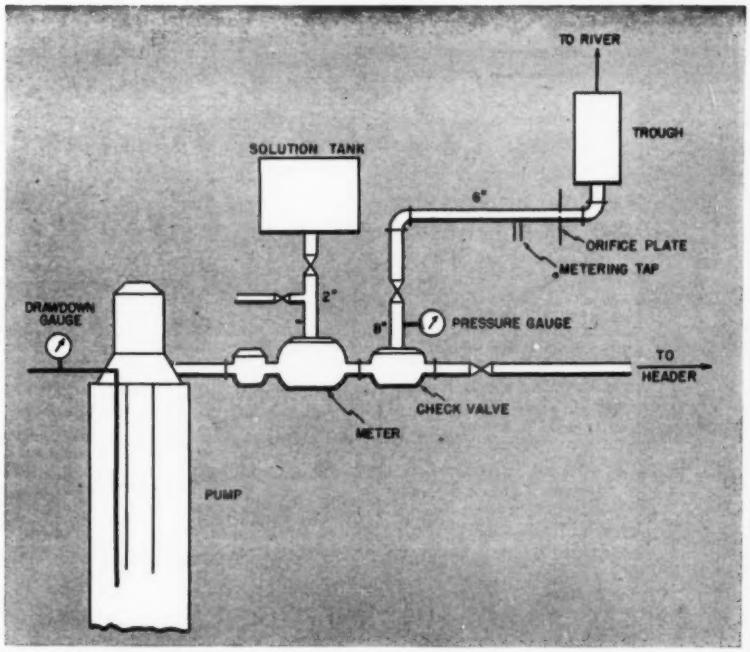


Fig. 2. Here is set-up described for treating, flushing and metering flow from well

solution to drain into the well. See Fig. 2.

After the solution was drained into the well, the well was agitated by starting and stopping the pump as the water reached ground level. After the well was agitated 15 times a solution containing twenty pounds of calcium hypochlorite and water (approximately 100 gal) was mixed in the tank and drained into the well. The well was again agitated, making sure that the two solutions were well mixed and flowing back into the strata.

By using a mixing tank in this cleaning process we could pump approximately 200 gal of water from the well into the tank at the end of each back flushing period. After shutting down the pump this water would drain back into the well. With the water seeking its own level we felt assured that the solution was penetrating the strata.

Periodic Back Flushing

After the solution was drained into the well, the well was agitated approximately 15 times every four hours for a 48-hour period. It was then pumped to the river at a low rate of flow noting pressures, draw down, and conditions of the water. The flow

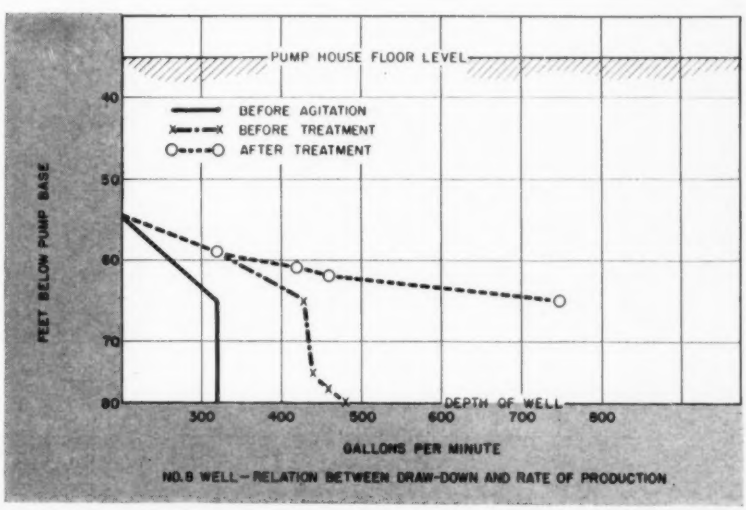


Fig. 3. Relation between draw-down and rate of production for Number 8 well

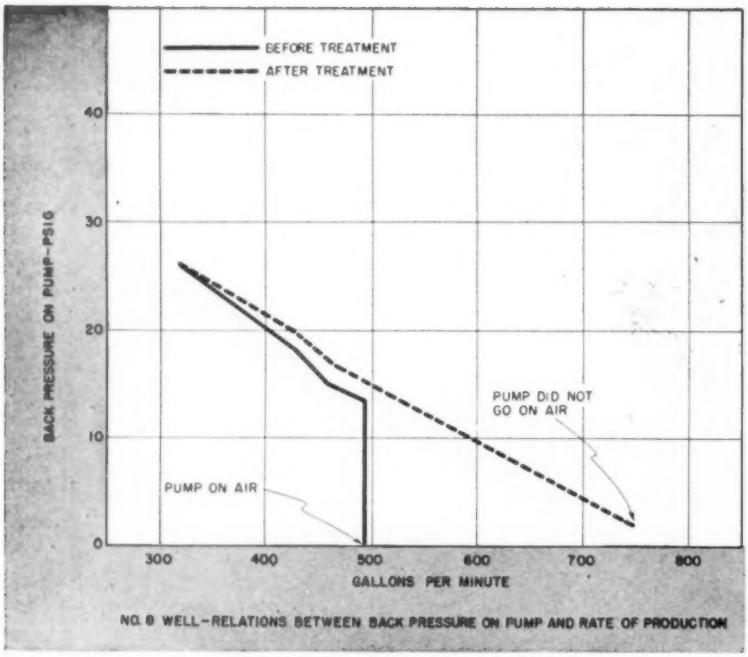


Fig. 4. Relation between back pressure and rate of production of Number 8 well

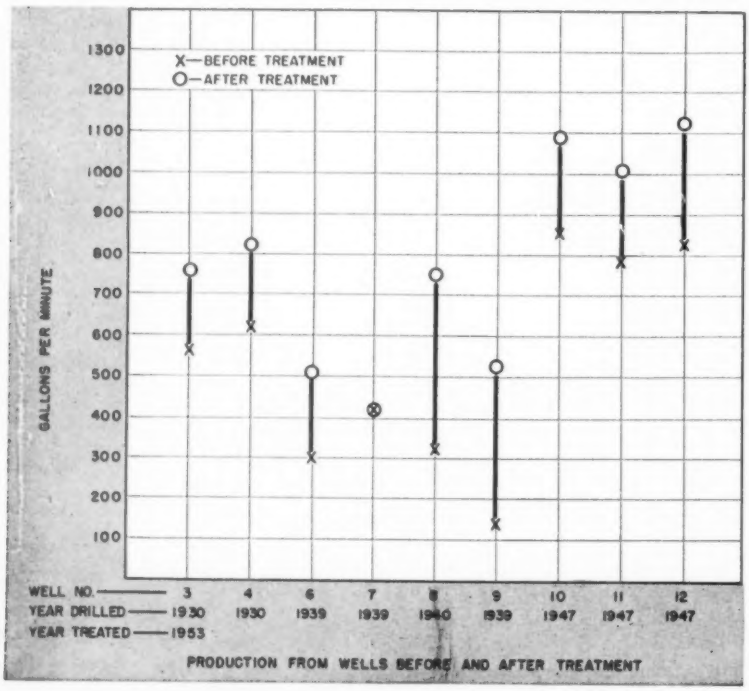
was gradually increased to a maximum production noting pressure, levels and condition of water under free flow conditions.

Periodic back flushing was done while a check was being made on the well. The most noticeable change was the color of the water. As mentioned before, by agitation alone the water clarified almost immediately, but after treatment, the water was almost black and remained so for several hours. We believe this to be a definite indication of the dispersion of iron, manganese and hardness that was lodged in the well and screens. After treatment of the well, checks were made on flows, static levels, as shown in Fig. 3, back pressure, Fig. 4, water condition, and river stages to determine the results of the treatment.

Results from the initial treatment were highly gratifying. Production increased to 750 gpm with a draw down of 11.9 ft, as compared with production of 320 gpm with a draw down of 11.6 ft, before agitation and treatment.

This indicates that either the screen, strata, or both had been plugged.

Fig. 5. Production, in gallons per minute, from wells before and after treatment



Other Eight Wells Treated

Encouraged by the above results, the other eight wells were treated and checked in the same manner. Satisfactory results were obtained by the treatment, as shown.

The frequency of the need for treating our wells is yet to be determined. It is presently believed that a yearly cleaning with a glassy phosphate will maintain these wells at a satisfactory rate.

With a very noticeable drop in the water table along the valley, production of existing wells must be kept at a maximum. Only through periodic cleaning can this be done. With the complete record as made on the cleaning of our wells in 1953 and a cleaning program in effect for 1954, we will be able to obtain additional data on the cleaning method and the benefits derived from such a program.

The tank used in the cleaning process for the purpose of dissolving the glassy phosphate and the calcium hypochlorite, was fabricated to suit the conditions of our wells. The tank was made from a section of 44 in. OD pipe, approximately 5 ft long with a center top support for suspending the basket into which the glassy phosphate is placed for dissolving. The tank was mounted on wooden skids and so elevated as to drain from the bottom of the tank into our well. By using our plant truck we were able to drag the tank to all of our well locations. No changes to piping on the tank were required as we moved from one well to another.

How Solution Is Fed to Well

The solution from the mixing tank was fed into the well with a 2 in. line through an opening on our turbine type meter made by removing the counter or totalizer. After the 48-hr period of backflushing, the well was pumped to the river through the top of the check valve. Connection was made by removing the blind flange on top of the check valve and replacing with a fabricated flange and piping arrangement shown in Fig. 2. All flows are measured through an orifice at the end of flushing line to the river.

CLEAN CASTINGS — Fast, At Ford's Cleveland Foundry

Excellent work flow, methods and equipment make for unusually high output at this modern foundry

By W. I. GLADFELTER, Chief Engineer, Pangborn Corp.

WHEN FORD MOTOR Company decided to build its great new Cleveland foundry, a basic principle was established to guide the planning. This new foundry was designed to produce high quality castings with the most modern of mechanized equipment and in surroundings providing the finest possible working conditions.

This particular foundry handles the casting and machining of engine cylinder blocks, heads, flywheels, intake and exhaust manifolds, flywheel housings and other parts for 6-cylinder Ford engines and 8-cylinder V-type Mercury engines. While it is not the largest foundry in the country from the standpoint of current output, it is certainly one of the most modern and undoubtedly one of America's largest production foundries. A significant point which serves to substantiate the advance design of the foundry is the fact that approximately 12½ per cent of the total cost of the completed plant was spent for ventilation, dust arresting and smoke abatement equipment. This expenditure has resulted in an operating foundry which is second to none in cleanliness.

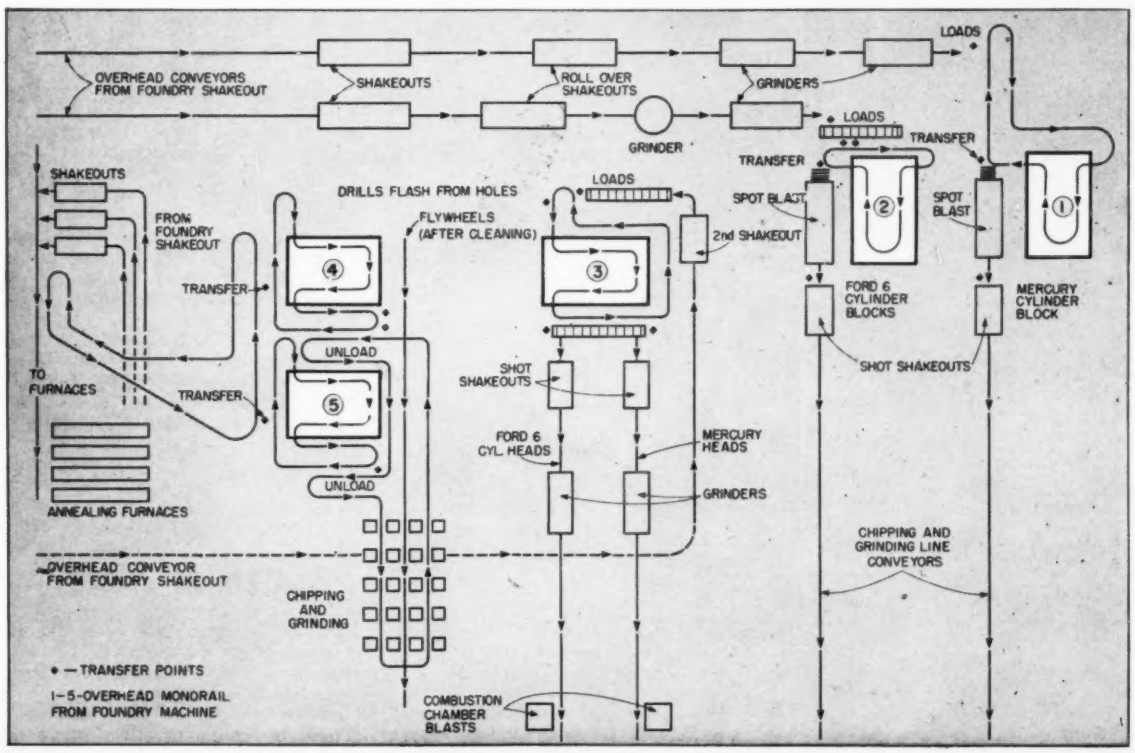
Foundry and engine plant are located on the same plot of 112 acres, approximately 10 miles from the center of Cleveland. The main foundry building is 1390 ft long and 480 ft wide and has 1,200,000 sq ft of floor area, including the basement. The foundry will melt 1800 tons of metal daily—to be expanded to 2100 tons production. Molding systems take about 24,000 tons of sand per day and indoor sand storage bins hold 54,000 tons. The ventilating system is designed for five to six air changes per hour, requiring the circulation of approximately 3,000,000 cu ft of air per hour. At capacity operation, the foundry employs about 3500 workers, yet is so spacious and highly mechanized that the workers seem almost conspicuous by their absence.

Operations in the cleaning room can be divided into three broad categories: (1) cylinder blocks; (2) cylinder heads; (3) small parts.

Taking these three types of cleaned products in order, we find that cylinder block castings enter the cleaning department at the southwest corner of the building and travel along the west wall to the first operation—opening locating holes on the tops and water openings on the ends and tops of the blocks.

After this step is completed, the blocks are deposited crank case side down on plate conveyors. They are carried to roll-over shake-out equipment which swings the blocks up on

Fig. 1. Floor plan of the castings cleaning room at Ford foundry shows why high output is normal at this plant



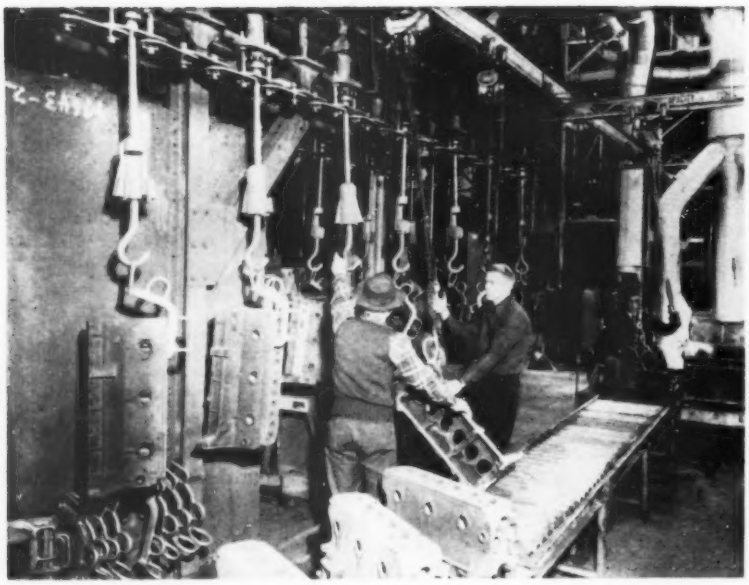
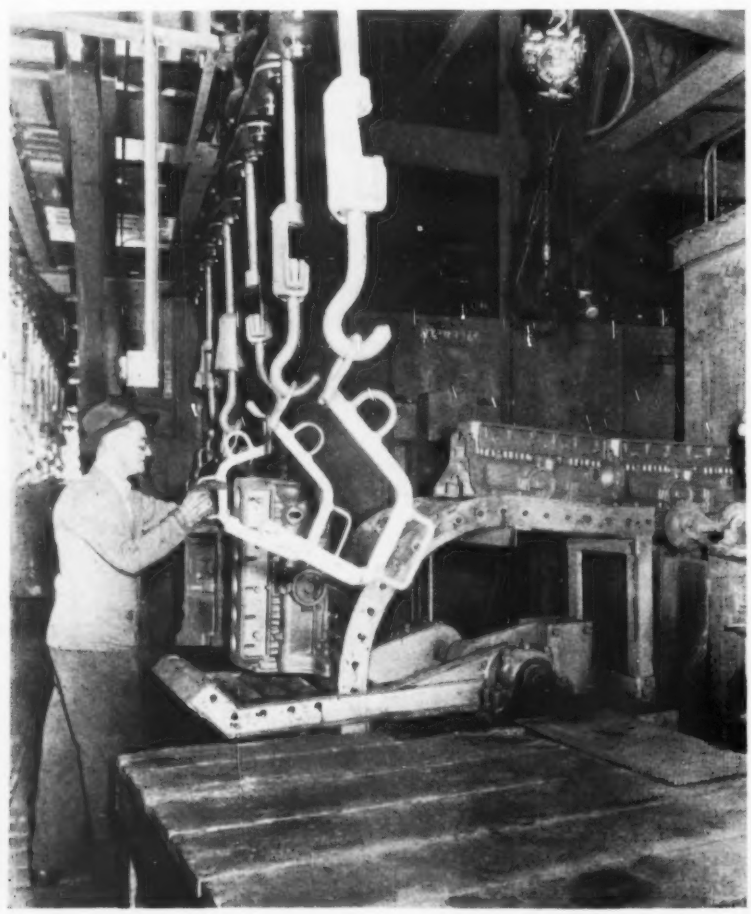


Fig. 2. Shot blast machine No. 2 which is used to clean cylinder blocks for 6-cylinder engines. Worker at right transfers casting from grinder to roller conveyor where the two workers in center will load it onto overhead conveyor hooks

Fig. 3. Close-up shows a worker transferring cleaned cylinder block casting from overhead conveyor hook to mechanical loader for entry into spot blast machine location of which can be found in upper right of diagram on preceding page



end and deposits them on hooded, vibrating grids. Side plates hold the castings in vertical position, after which they are dropped to a point where the tops of the blocks rest on grids. This operation removes the sand which forms water jackets in the blocks.

At the next station, an air hammer is used to knock off any fins which might remain on the castings. Grinding follows with a slight difference in grinding procedure for the 6- and 8-cylinder blocks. The 8-cylinder blocks, with crank case side up, are ground in a special machine connected to an exhaust system. Three wheels are used to grind the end of the crank case and the two ends of the block.

Blocks then emerge onto a conveyor where they are turned so that the tops of the cylinders are up and center lines parallel to the line of travel. Next, they pass through a hooded grinding machine which faces off the tops of the cylinders. The blocks are then picked up and hung on hooks suspended from an overhead chain conveyor which carries them through a special six wheel shot blast cleaning machine where all scale and burnt sand is removed down to bright virgin metal.

Different equipment is used to grind the 6-cylinder blocks. These are placed on a 15-ft diameter rotary table which contains eight holding fixtures to maintain the blocks in a vertical position. This grinder is designed so that the blocks can be surface ground on the top and bottom simultaneously.

Grinding Operations

The blocks are then taken off the rotary machine and moved on a conveyor to a two wheel grinder which grinds both ends of the block at once. The next step is to hang the blocks on hooks and send them through a continuous shot blast cleaning unit. One of these units is used only for 8-cylinder blocks, the other for 6-cylinder blocks. These two pieces of equipment operate as follows:

Shot blast No. 1 is an ES monorail conveyor machine with six Rotoblast units which clean Mercury V-8 cylinder blocks at a rate of 240 per hour. It is scheduled to operate 16 hours a day on two shifts. Each Mercury cylinder block will pass through the machine on an overhead conveyor, one cylinder block per hook. Since the Mercury block weighs 184 lb, the tonnage cleaned adds up to about 22 tons per hour. A spot blast machine utilizing four air-blast nozzles, is located alongside the ES cabinet. As the cleaned castings leave the main cabinet they are placed in the spot blast by a mechanical loader, pass through it and go on to the shot shakeout. Then, by conveyor, they move on

to the chipping and grinding line.

Shot blast No. 2 is an identical piece of equipment, but will handle Ford 6-cylinder engine blocks at the rate of 240 blocks per hour. A spot blast machine is located alongside No. 2 as in the case of No. 1. The Ford cylinder block weighs 175¾ lb and is cleaned one block per hook. Tonnage cleaned by this machine amounts to approximately 21 tons per hour.

After shot blasting has been completed, both 6- and 8-cylinder blocks are transferred from overhead conveyor hooks to roller conveyors which move them to the spot blast units. Blocks then move out from spot blast through an abrasive shake-out unit and onto a continuously moving slat conveyor which carries them through chipping and grinding stations.

Heads for the 6- and 8-cylinder blocks are carried into the cleaning department on an overhead conveyor suspended on cradle hooks. They are removed from the conveyor, placed on a shake-out and then moved on to a short, slat conveyor. At this point they are picked up and placed on special hangers suspended from another overhead monorail conveyor for the trip through shot blast No. 3.

Shot blast No. 3, a similar machine, has six Rotoblast units which are used to clean Ford 6 and Mercury cylinder block heads. These two types of heads enter the machine indiscriminately and are sorted after cleaning and routed from the machine by way of separate conveyors past separate chipping and grinding lines. At present, this machine is used exclusively for Ford 6 heads. These weigh 66 lb and are loaded 3 to a hook. The machine is set to travel at a speed which will clean three hooks per minute or 540 heads per hour, a total of nearly 18 tons per hour.

For All Small Parts

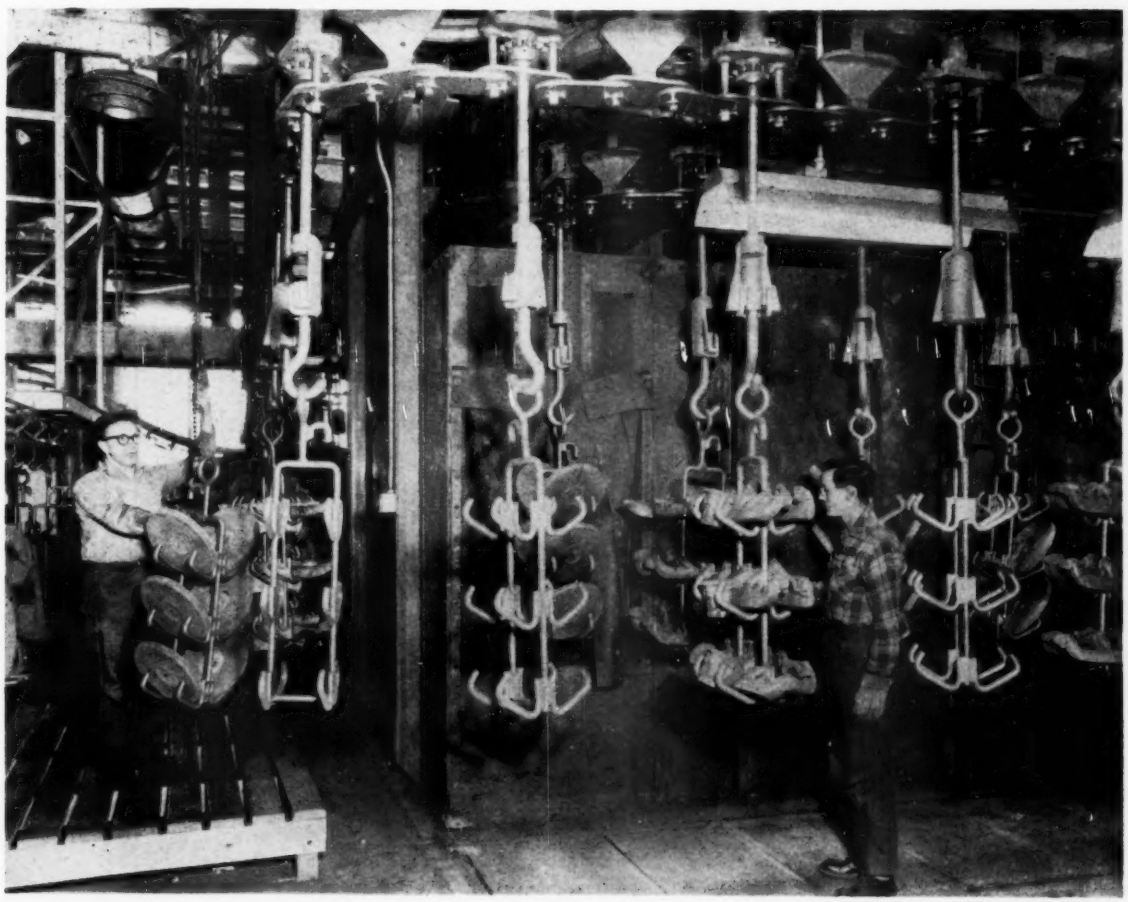
Shot blast machines No. 4 and 5 are used to clean flywheels and intake and exhaust manifolds. At first, it was planned that one machine would clean one part exclusively. However, all classes of work, known as small parts, now go through both machines. Each monorail hook will hold either six flywheels or six manifolds. Weight of the flywheel varies from 37 lb for the Ford 6 to 41 lb for the Mercury. Ford 6 manifolds weigh 14 lb (intake) to 16¾ lb (exhaust). Mercury manifolds weigh 22 lb for the intake and 9 and 10½ lb for exhaust.

All of the overhead monorail shot blast cleaning machines are equipped with two-speed drives. This type of drive provides for a slow speed as the castings rotate on their hooks and pass through the blast streams from each Rotoblast wheel, and a faster speed as the machine indexes between cleaning stations. The blast cleaning production of these five Pangborn machines totals 85 tons per hour.

In addition to the five larger machines, Ford Cleveland Foundry has a 9-ft Rotoblast table which will be used principally for cleaning cylinder block heads and other parts on which welding becomes necessary.

There are also two special airblast machines designed as combustion chamber blasts. The purpose of these machines is to guarantee that the combustion chambers are of exactly equal volume. If inspection indicates that one or more combustion chambers are smaller than required, a reciprocating nozzle and timer arrangement blasts out sufficient metal to equalize the volume.

Fig. 4. At shot blast No. 4, worker on the left transfers tree of flywheel castings from conveyor line to blast cleaning line



Plant Engineers Form National Organization

American Institute of Plant Engineers incorporated as a non-profit organization to further the professional interests of the plant engineer and foster the development of this specialized branch of engineering to include the Americas

Suggested insignia designed by Plant Engineering's staff artist, Jim Wilcox

PLANT ENGINEERS CLUBS exist from coast to coast and from border to border. In the few years that these have been building there has been discussion of a national organization. With more than a score of strong local organizations operating across the country the interchange of information between the groups has been considerable and the pressure to combine and form a larger organization has been more evident during the past year.

Last fall at the first regional meeting of the independent clubs, a meeting sponsored by the Calumet group (see page 118, PLANT ENGINEERING, Jan., 1954), the question of a national organization was brought up for discussion. It was favorably received and the discussion indicated that more

Fig. 1. Officers of three Chicagoland Clubs met and decided to back national organization broached at Calumet meeting

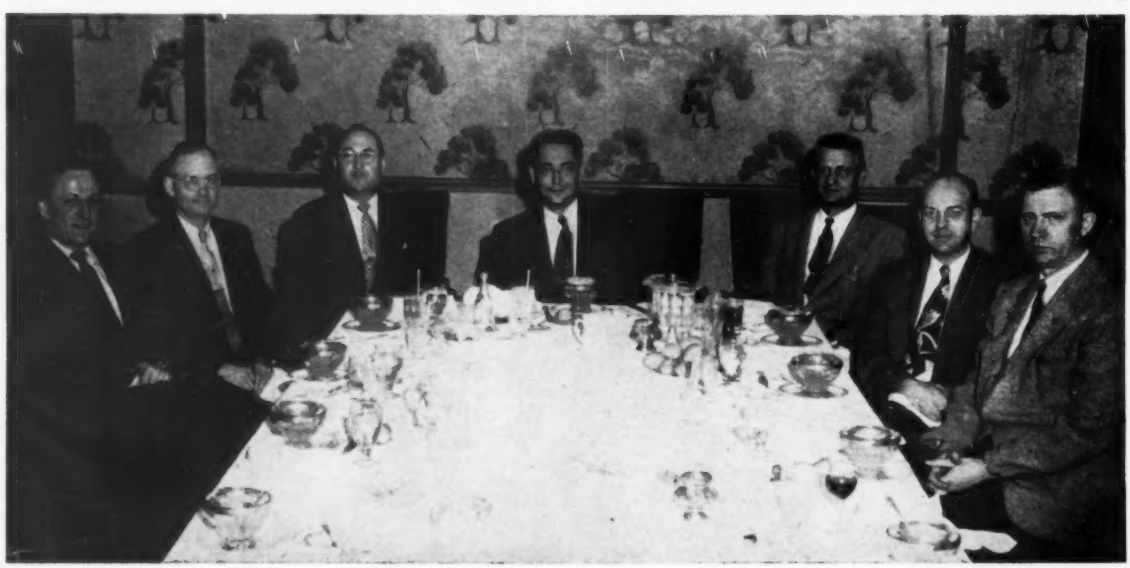


Fig. 2. Eleven clubs were represented at the Stock Yard Inn meeting where it was decided to form a national organization

detailed plans should be made at once.

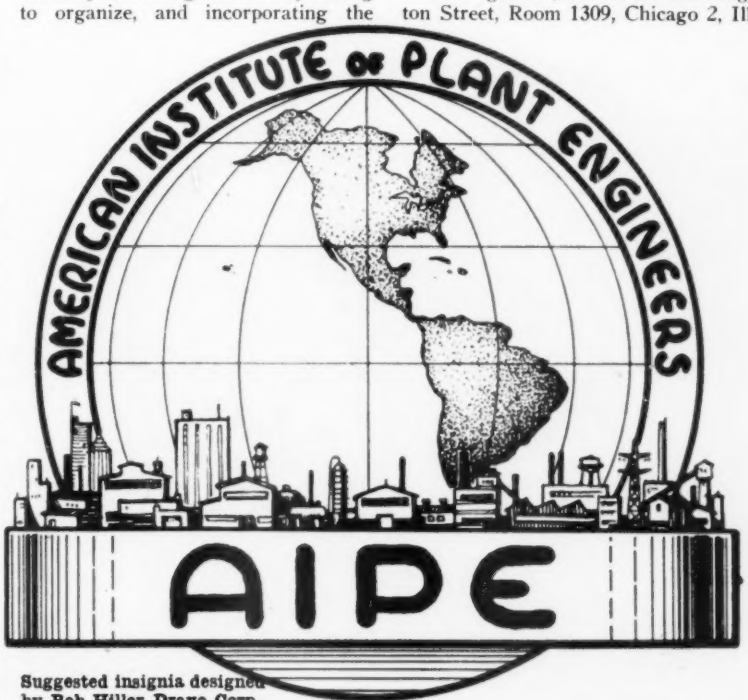
Accordingly the officers of the three Chicagoland groups, Chicago, Calumet and Northern Illinois, met shortly thereafter. They gave detailed consideration to the proposal and discussed the type of organization which would most likely receive the approval of the majority of clubs already organized. The project looked so promising that it was taken up informally with acquaintances in the Eastern Clubs where it had also been under consideration.

Meeting Attended by 11 Clubs

Subsequently, members of 11 clubs met in Chicago for the purposes of following through on the suggestions and to determine if an organization, of a type which their club could support, could be worked out. A thorough discussion indicated general agreement on the need for such an organization and the desirability of getting it under way immediately. Because other clubs are now being organized in Canada, Mexico and South America, the possibility of broadening the organization to include the Americas rather than limit it to the United States was not overlooked.

At this rump session, agreement was reached on the general objectives, the scope and form of organization. A motion empowering a committee to proceed with the legal incorporation of a non-profit organization was passed unanimously. This organization is the American Institute of Plant Engineers, essentially an organization of autonomous clubs free to continue local policy as set forth in their written or implied by-laws, yet banded together to further the professional interests of the plant engineer where national or international cooperation is desirable.

Groups now organized or planning to organize, and incorporating the term plant engineer in their name or title are eligible for charter membership. Individual plant engineers to whom local chapter membership is not now available are eligible for membership-at-large. The official representative of the new organization is Earl Arkiss, American Institute of Plant Engineers, 111 West Washington Street, Room 1309, Chicago 2, Ill.



Suggested insignia designed by Bob Hiller, Dravo Corp., member of Pittsburgh Club

News Roundup of the Plant Engineering Societies

Here's what the various Plant Engineering Societies are doing: . . . Pittsburgh group tours Dravo Corp. . . . New officers for New York, Twin City, Northern New Jersey, Philadelphia and Detroit . . . Milwaukee affiliates with ESM

AS THE NUMBER of Plant Engineers' Societies increase so will their activities. Following is a brief report of what some of these Societies are doing:

Northern New Jersey

In addition to their regular meeting, the Plant Engineers' Club of Northern New Jersey held their annual election of officers.

New officers for the coming year will be: George Matko, Reichhold Chemicals, Inc., president; Gerard Scheyer will serve as vice president; and Nicholas Marchak, of Sun Tube Corp., will take over the duties of secretary-treasurer.

This was the last meeting of the Northern New Jersey Club until the fall.

Detroit

At the last meeting of the Plant Engineers' Society of Detroit before the summer months, the members elected new officers for the coming year.

George Breisch, of Parke, Davis & Co., will be the new president; Burt J. Drummond, Detroit Steel Products Co., was elected vice president; Tom C. Gest, Republic Steel Corp., is the new secretary and Ken Mercik, Bulldog Electric Co., will take over the duties of treasurer.

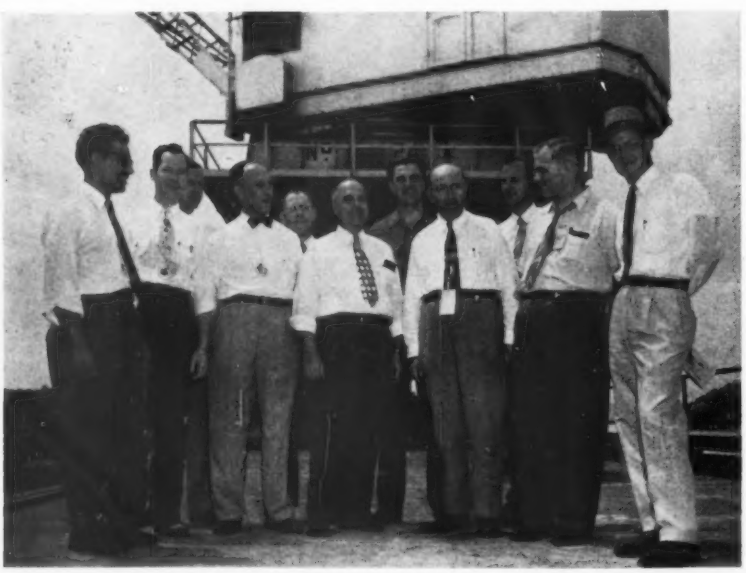
Board Members for the coming year will be: R. A. Melton, Chrysler Corp.; R. B. Gilray, Motor Products Corp.; and James Briggs, James Vernor Co.

The first fall meeting of the group will be on September 27.

Twin City

The second meeting of the Twin City Plant Engineers' Society was held on May 17, with 28 of the original 32 members present. A constitution and by-laws were presented to the members at this meeting and a final draft was adopted.

Officers were also elected at this meeting to conduct the group's activities for the coming year. Paul Bowman, Seeger Refrigerator Co., will take over the duties of president; A. C. Born, Northern Ordnance, Inc., will serve as vice president; K. F. Johnson, Pillsbury Mills, Inc., will be the secretary; with J. Warwick, Minneapolis Moline, as treasurer. Member at large will be C. F. Hoover, of Minnesota Mining and Manufacturing Co.



Members of the Plant Engineers' Association of Pittsburgh who toured the shops and yard of Dravo Corporation's shipbuilding and steel fabricating plant

Pittsburgh

One of the recent meetings of the Plant Engineers' Association of Pittsburgh consisted of a tour of the Neville Island plant of Dravo Corp. Members of the group witnessed the launching of a new river towboat, enjoyed a luncheon at the company's cafeteria, and inspected the shops and yard of Dravo's shipbuilding and steel fabricating plant.

A photograph of the men who took in the tour appears on this page. From left to right, they are: Thomas A. Comento; Continental Can Co.; George W. Williams, Neville Chemical Co.; Harry S. Schoeffel, Callery Chemical Co.; Lou J. Sitomer, Neville Chemical Co.; L. N. Crow, George E. Drake Baking Co.

R. W. Hiller, Dravo Corp.; Harold N. Leach, Pittsburgh Forgings Co.; Theodore L. Bieber, Westinghouse Air Brake Co.; F. C. Williams, Dravo Corp.; John F. Lytle, The Vulcan Detinning Co.; and James B. Tafel, PLANT ENGINEERING.

Milwaukee

The Plant Engineers' Society of Greater Milwaukee recently joined the circle of engineering societies affiliated with the Engineers' Society of Milwaukee.

New York

At the May meeting, the Jacob Ruppert Co. again played host to the New York Plant Engineers' Association. After a delicious roast beef dinner, the nominating committee presented a slate of officers for 1954-1955.

Frank McDermott, Lever Bros. Co., was nominated for president and A. J. Weiss, Lowe Paper Co., was nominated for secretary-treasurer. Since no other nominations were made from the floor, the secretary was instructed to cast a ballot for these men, and they were voted upon unanimously.

Following the election of officers,

past president Harold Travis, of Jacob Ruppert Co., introduced a panel consisting of Messrs. H. J. Knell, Wright Aeronautical Co.; W. D. Lewis, Hotel New Yorker; F. L. Bradley, Forstmann Woolen Co.; and H. L. Hayden, Du Pont Co.

The panel discussed unusual plant engineering problems which they had encountered and solved. A few problems were introduced to which they had not yet arrived at a solution and these were thrown open to general discussion and recommendation. There was a considerable amount of interest in this discussion and meetings of this type will be held more frequently in the future.

Philadelphia

The Plant Engineers' Club of Greater Philadelphia elected Donald P. West, plant engineer of Simonds Abrasive Co., to the job of president for the coming year.

Other officers elected include: Fred B. Richardson, John Wanamaker, as vice president; Daniel R. Long, Crown Can Co., as director and Wilber W. Ferris, Electric Storage Battery Co., as secretary-treasurer.

These men, together with B. W. Van Dyke, of Standard Pressed Steel, and past president, John M. Waligora, chief engineer of Sharp & Dohme, will serve as the governing board for the Greater Philadelphia Club.

Plant Engineers' Society Formed in the Los Angeles Area

PLANT ENGINEERS from Los Angeles, Culver City, Pasadena, Corona, El Segundo, Van Nuys, Torrance and Azusa got together on June 22 at the Rodger Young Auditorium, Los Angeles, to form the Plant Engineers' Society of Los Angeles.

Among the men present were: W. H. Bayley, South California Coop. Wind Tunnel, Pasadena; T. J. Cook, B. F. Goodrich Co., Los Angeles; O. A. Egeler, Chysler Corp., Los Angeles; G. A. Evans, Axelson Manufacturing Co., Los Angeles; C. W. French, Studebaker Corp., Pacific Div., Los Angeles.

W. Fore, North American Aviation, Inc., Los Angeles; W. F. Gabor, Pabst Brewing Co., Los Angeles; R. Hardy, Lincoln-Mercury Div., Ford Motor Co., Los Angeles; J. S. Hutchinson, Exchange Lemon Products Co., Corona; T. H. Hardgrove, Aerojet-General Corp., Azusa.

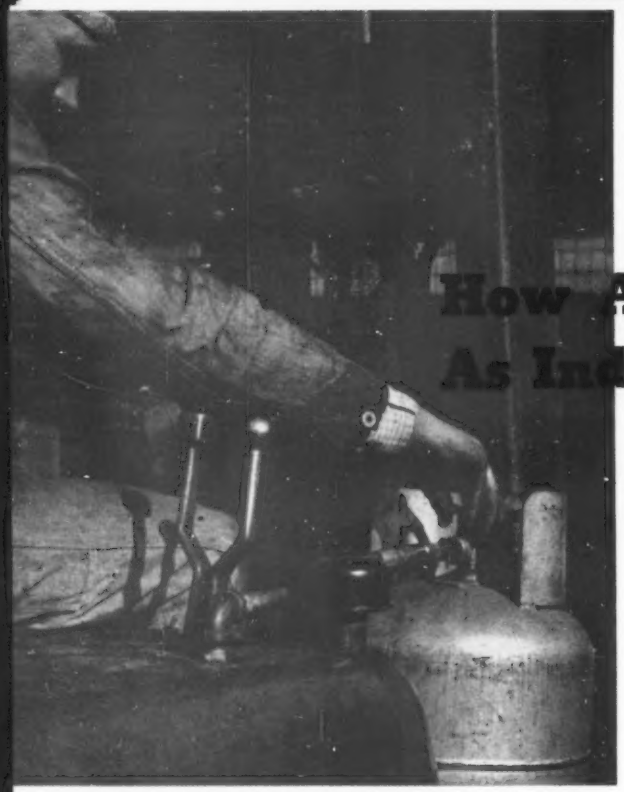
C. M. Johnson, American Radiator & Standard Sanitary Corp., Torrance; G. W. Mackenzie, Nash Motors, El Segundo; F. P. McCormack, Exchange Lemon Products Co., Corona; R. McPeck, General Paint Co., Los Angeles; R. Mercum, Hughes Aircraft Co., Culver City.

J. Morris, Aluminum Co. of America, Los Angeles;; J. W. Mosely, Lincoln-Mercury Div., Ford Motor Co., Los Angeles; R. G. Nygard, Minnesota Mining and Mfg. Co., Los Angeles; T. Obitake, Pacific Wire Rope Co., Los Angeles; F. C. Rogers, A. O. Smith Co., Los Angeles.

W. A. See, Chevrolet Motor Div. of GMC, Van Nuys; R. E. Sessler, Lever Bros. Co., Los Angeles; W. H. Slater, Emsco Manufacturing Co., Los Angeles; R. E. Travers, Ford Motor Co., Long Beach; James M. Weeks, Plomb Tool Co., Los Angeles; R. E. Wills, Pabst Brewing Co., Los Angeles; and R. H. Morris, Editorial Director, PLANT ENGINEERING.

F. C. Rogers was nominated temporary chairman. He will be assisted by T. H. Hardgrove, vice pres., and J. Morris, secretary-treasurer.

Twenty-six plant engineers from Greater Los Angeles area attended organizational meeting at Rodger Young Auditorium



How About LPG As Industrial Truck Fuel?

Certain distinct advantages accrue from the use of liquefied petroleum gas as a fuel for your industrial trucks . . . It costs money, of course, and is not a cure-all but it is well worth considering if it would help

Fig. 1. LPG fuel can be shut off at the tank as shown here or by means of special self-sealing coupling hose

VIA THE INDUSTRIAL truck, LP-Gas has moved from highway trucks, stationary engines and automobiles right into the plant. There are more than 170,000 industrial trucks working for U. S. industry. And this year many will be converted to LP-Gas.

Why? Because out of these 170,000, many are gasoline-powered, and their exhausts, heavily carbon monoxided, have been plaguing many a plant and warehouse. Perhaps their fumes have come under scrutiny of late because we're all growing more smog conscious. Nonetheless, there's no denying that gasoline combustion is a prime offender.

Admittedly, relatively few fork-lifts have been converted to date. Yet a definite trend is developing.

Facts About LPG

Spearheading the move are these facts:

1—Some plants report maintenance savings up to $500 annually, when operating lifts on butane.

2—Butane operation definitely reduces, often eliminates objectionable fumes altogether.

3—Savings per gallon of butane as compared to gasoline, while not spectacular, average 7 cents.

4—Fork-lift engines, burning butane (a dry gas), need to be overhauled far less frequently. Some operators report as many as 8000 hr between major overhauls.

5—Idling, cold-running fork-lift engines build up less sludge when burning butane. Seven thousand hours between oil changes is not unusual.

6—Cost of converting a standard fork-lift gasoline engine to butane or propane approximates $200.

Even with these advantages, however, many plant managements have been slow to convert. Reason: the long-standing belief that LPG is "dangerous"—at least more dangerous than gasoline. The fact is that proper high-pressure equipment (250 psi), plus such safety devices as fuel cut-offs, self-locking couplers and special hoses make LPG as safe as gasoline.

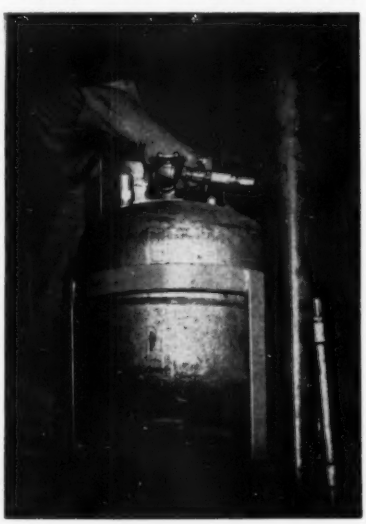
Whereas truckers and motorists who have converted from gasoline to butane often aren't convinced of LPG's advantages (because only extensive engine-wear tests show the difference), the average fork-lift conversion proves its worth within a few hours. How? Because of the drastic, very obvious reduction in irritating fumes.

It can be argued, of course, that a properly tuned and maintained gasoline engine gives off only minimum fumes. Trouble is, work weary lifts seldom can be spared for frequent tune-ups. Pretty soon they're contributors to the warehouse's or plant's contamination problem.

Why are butane fumes "less irritating?" Because gasoline exhausts contain nearly 14 times as much carbon monoxide as do exhausts from an LPG-fired engine. Difference lies not only in the chemical content of the two fuels, but in their combustion. LPG burns as a dry gas; gasoline as a wet. This difference directly affects engine wear.

However, there is none of the cylinder "wash-down" effect so prevalent in gasoline engines when idling

Fig. 2. Removal from this welded steel carrying fixture is quick and easy



—as fork-lifts do much of the time. Wash-down by liquid gasoline means loss of lubrication and substantial engine wear. Dry-burning LPG isn't liquid, can't "wash-down" cylinders.

Proof of good maintenance savings comes from various plants now using fork-lifts LPG-fueled. Typical case histories:

1—One conversion ran 7000 hr before lube oil change. Although samples were sent to an independent lab every six months or so, they came back time and time and again tabbed "OK."

2—Another lift, a Clark 2-ton with a Continental 4 cylinder F-4121 engine, has run 3270 hr on the original 5 quarts of oil put in at time of conversion.

3—A warehouse maintenance superintendent reports savings as high as $500 per unit per year—on maintenance alone.

4—Another, that "we run 100,000 miles—figuring 35-miles to an hour's operation—between engine overhauls."

5—Still another used to change lube oil every 48 to 60 hours burning gasoline. Now claims to change lubricants every 200 to 350 hr.

While conversion involves only 4 to 8 hr work and costs but $200 per truck, the various manufacturers of fork-lifts and the makers of conversion kits, give specific warning: The engine must be in good condition to give satisfactory performance and economy. LPG isn't going to remake an old, inefficient engine into a smooth-running unit. If the engine's compression is too low, it can't take advantage of LPG's high octane combustion. As a guide, here's how the engine should stack up:

1—A compression ratio of 6.5 to 1 or higher is advised.

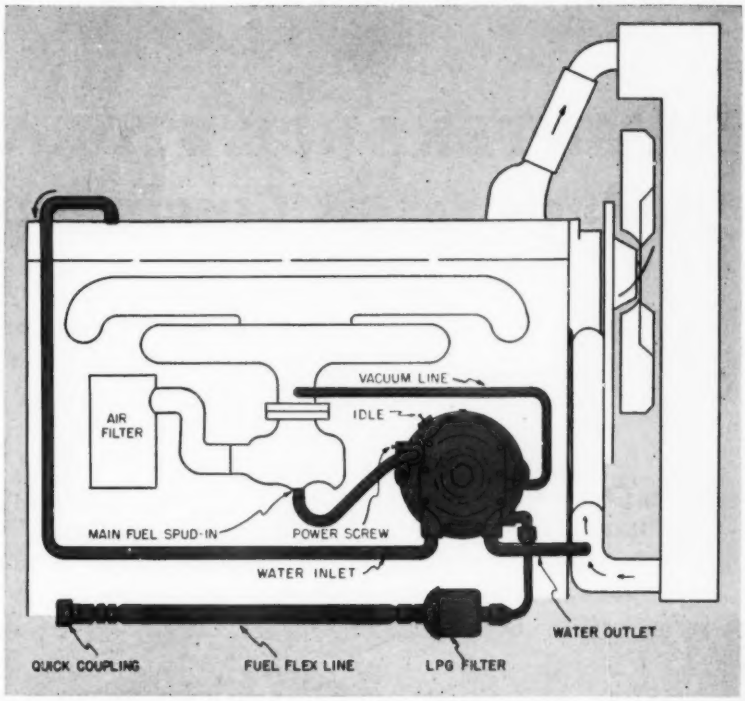


Fig. 4. Diagrammatic representation of typical installation on industrial truck

2—A hotter spark is required. Slight ignition faults in gasoline operation will be much more pronounced in butane operation.

3—Ignition timing must be advanced several degrees compared to gasoline operation.

4—Oil has tendency to become thicker, since it is not as diluted as in gasoline combustion.

5—Because LP-Gas is a dry fuel and has more volume, both a larger volume intake system and a cooler manifold are advantageous.

6—Sufficient valve clearance is more important with butane than gasoline.

7—Cleaner air filters and air intake elbows are necessary for proper combustion.

A typical conversion kit, selling for $125-$175, includes: a vaporizer-regulator; carburetor spud-in; butane-propane filter, a set of fuel and water lines, fittings, including flex line and copper tubing; a two-way shutoff coupling socket and either three 5-gal vertical fuel tanks or two, 6.6-gal horizontal tanks.

Changing tanks is a 30-second operation. Tanks are sometimes seated on a welded, steel platform, either beside the fork-lift driver or directly behind his seat. Two or three heavy spring-loaded clamps hold the tank steady. Or, a steel-framing of welded strap metal can be rigged to form a kind of bucket, in which the tank is seated.

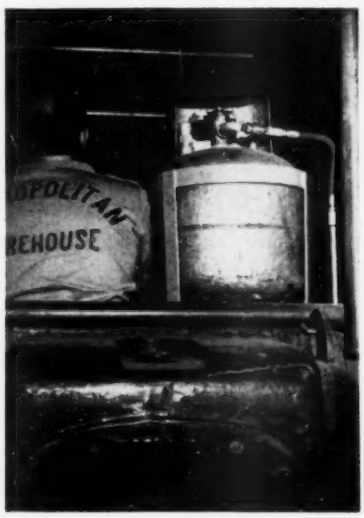
Installation (best at hands of experienced LPG mechanics) consists of a flexible, high pressure hose (250 psi) running from tank to butane filter unit. The hose is coupled with quick-change, self-shut-off fixtures. Pull the connection apart, and both uncoupled ends—the one to the filter, the other to the tank—seal by spring action. A valve on the tank further assures complete shut-off.

Liquid LPG flows through the filter, into a heat-exchanger-regulator where it's converted to gas. Dry gas then goes to the engine's carburetor.

(Continued on page 153)

Fig. 3. Tank mounting method involves a welded stand and spring clamps

Fig. 5. Another mounting method consists of a welded frame of strap metal



MAINTENANCE STORAGE
A Business at Cincinnati Milling

It isn't always how many maintenance tools or parts you have around the plant or how much they cost, but which ones are available and when, that counts . . . Here's how one company makes sure that the tools are where they should be—on the board or being used out in the plant

By **DALE JORDAN**, Supervisor of Equipment Maintenance, and
GORDON WUNKER, Dispatcher, Cincinnati Milling Machine Co.

Fig. 1. Here's the entire maintenance tool board so photographed that the silhouettes are visible at back of the tools

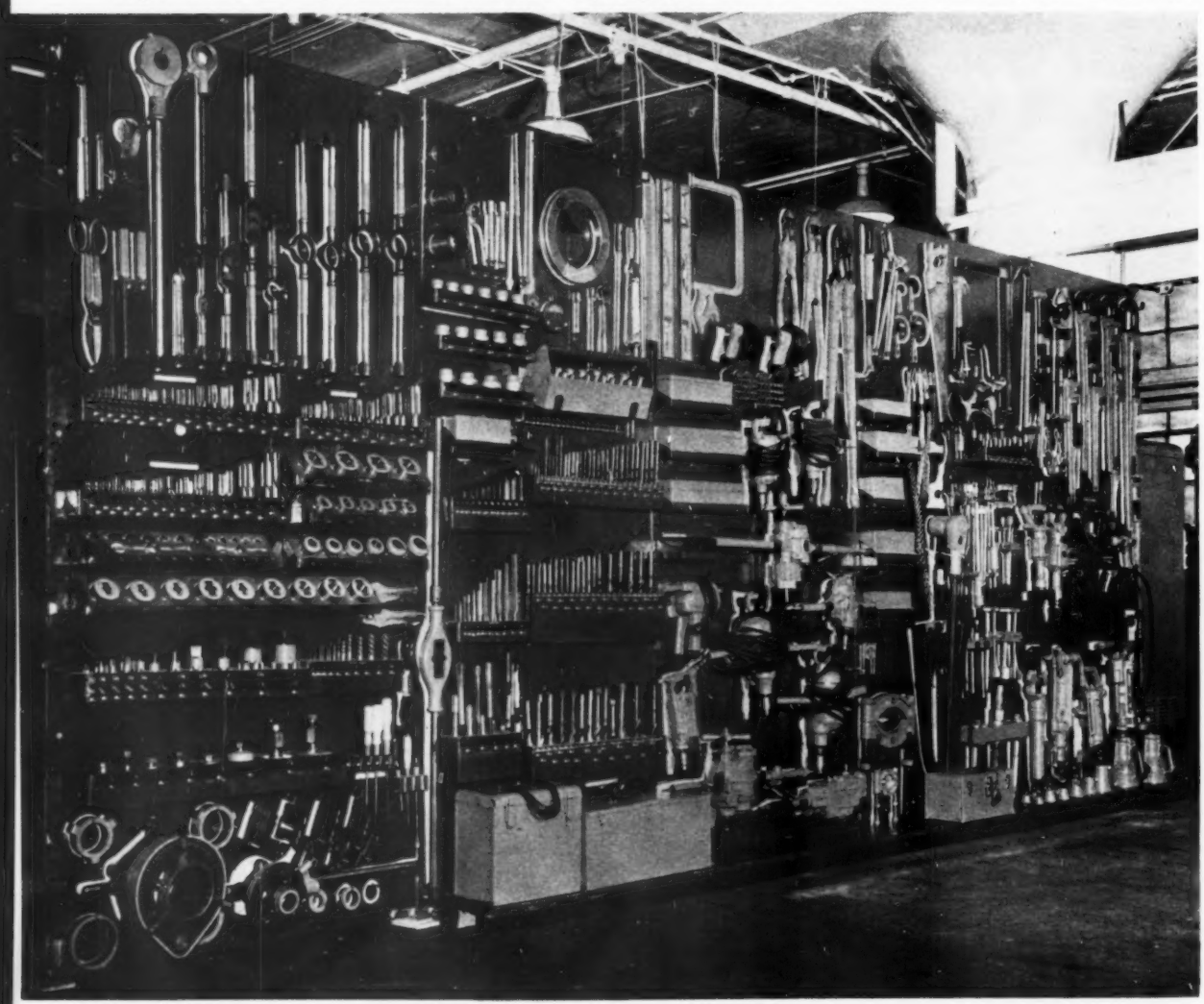


Fig. 2. They used to store v-belts in bins but this took too much time in storing, issuing and taking inventory. Now they are on racks like this and the job is considerably speeded

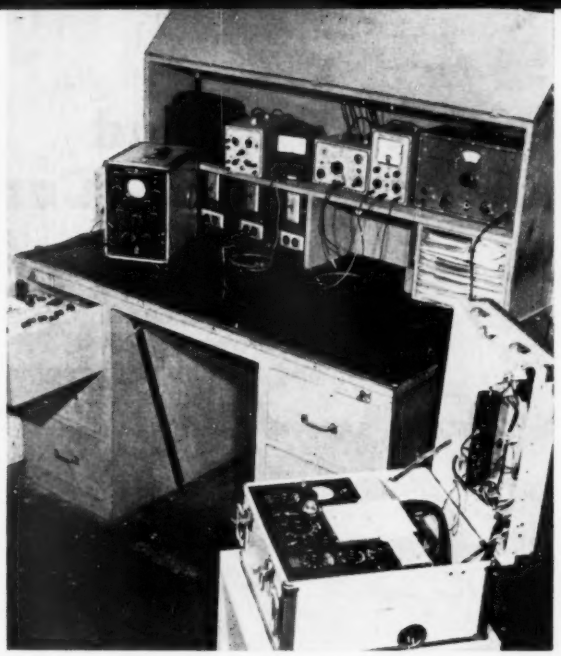


Fig. 3. Electrical test equipment is pretty sensitive and could be damaged or get dirty under ordinary storage. This work bench and storage unit keeps them on hand and clean

MAINTENANCE TOOLS KEPT in cabinets, drawers and other places where they cannot be readily seen lose some of their potential usefulness.

Because an employee is not visually reminded from time to time what tools are available to help him in his work, his job effectiveness may be reduced.

A large metal mounting board, Fig. 1, built and laid out by men in our department is doing a good job in helping us get more use out of our tools and to keep better track of them. It is equipped with hooks, supports and racks to hold some of the many items that we store to keep our equipment operating.

Behind the various handtools suspended from this board, we have painted shadow patterns to conform to the general shape of each item. This feature permits us to readily spot the absence of a tool; a brass tag placed near the yellow painted area exposed by the missing tool indicates that someone has the item on a job somewhere in the plant. When the tool is returned, it can be quickly replaced on the board by matching it with its shadow pattern.

All maintenance tools are painted with a color that has been assigned to the maintenance department. In this manner, the possibility of being confused with tools of other departments is eliminated. In addition, a workman busy on a repair job is aided by the coloring in spotting any tools that he may misplace. The departmental number is also stamped on maintenance tools to make the job of identification that much easier.

Formerly, quite a bit of time was taken up in storing, issuing and taking inventory of our V-belts which were stored in bins. To correct this storage condition, we have installed racks, Fig. 2, from which we suspend our large assortment of belts. A tag attached to each hook which supports one group of belts gives the size and cross section. This arrangement permits the men to make a visual inventory quickly. It helps them keep a good supply of belts on hand since they can reorder stock before it becomes depleted completely.

Many chain hoists are kept ready in our maintenance storeroom for any jobs that may have to be done. The storage of these can become quite a problem. If thrown on the floor, they can become a tangle of chains and hooks, difficult to separate.

Formerly, we stored these hoists in cabinets and had to contend with the problem of tangling and the consequently awkward handling conditions of these cumbersome units. To solve this particular problem, we built a storage rack for hoists, Fig. 4. Spaced at uniform intervals along steel cross members are a series of chain loops. These are used to support the hoists by their hooks while the units are in storage. At the top of this rack we have installed a monorail for a service hoist. Now a chain-fall of the desired capacity can be quickly selected and placed on a shop dolly and taken to the job without any undue physical strain on the worker. The free length of chain is kept out of the way through the use of a semi-cylindrical container that is attached to each unit.

We keep a wide range of electrical equipment on hand for our trouble shooting work. This includes instruments for straight electrical checking as well as for electronic circuits and components. The test units are kept under cover to keep them from abuse and exposure to dust. See Fig. 3.

The storage unit which also doubles as a work bench is equipped with outlets from which 230-v a-c, d-c, and 115-v a-c regulated power is available.

Fig. 4. This storage rack for hoists has been a big time saver—and hoist saver. The monorail and service hoist at top of unit handles the hoists in storage

Visit to England and the I. Pl. E. Conference

Ostensibly to attend the annual Conference of Incorporated Plant Engineers, our intrepid editor sails for England . . . The following incoherent account of his travels points up the fact that every man can be his own expert . . . If any inconsistencies are found in this rambling narrative, undoubtedly they can be charged to battle fatigue

By THOMAS E. HANSON, Editor, Plant Engineering

PLANT ENGINEERS, like people—like *other* people—seem to be the same all over the world. And it's these similarities, not the differences, that make travel interesting.

Biggest surprise of the entire tour around England: That industrial plant practices in that country are pretty much up-to-date; this is contrary to the misconception I had harbored for some time.

It's true that most plants are older. This, in turn, brings out either the best, or worst, in the plant engineer. When it's the worst, he isn't there long; just like in the USA. Another similarity.

Primary reason for going to England was to attend the Conference of Incorporated Plant Engineers at Scarborough. This city, on the Yorkshire coast, is beautiful; the Grand Hotel, Conference headquarters, is modern and hospitable and conditioned for conventions. Unfortunately, I'm not, but the friendliness and hospitality of other members of I. Pl. E. made the Conference a nice place to be.

We started out, my wife Ethel and I, in London. Weather was hot and wet and, to our disappointment, "dry" martinis were the same way. Seems "dry Martinis" are Martini and Rossi vermouth—straight. Oh! The hardships!

Next stop was Edinburgh; we took a night train from King's Cross station, the unloveliest spot in all England. Second biggest surprise: The excellent sleeper accommodations. Adjoining rooms, with all the fixtures and fittings, for a very moderate price. Quality was above American standards, and the price considerably below.

Stopping place in Edinburgh was the Roxburghe Hotel. Here members of the Edinburgh Branch of I. Pl. E. along with their wives entertained us royally at dinner and cocktails. Country exports a lot of Scotch whiskey; they tried to use me as a container. Messrs. Partridge, Sievewright and Speir poured.

Drove back through Scotland and England to Leamington Spa, to stay at home of Bernard and Audrey Ough (pronounced Oh). From here, as guests of the Oughs, we went to American Mecca, Stratford-On-Avon, to see "Midsummer Night's Dream." Having read review of same play by same players in slightly Anglophobic Chicago Tribune, I was prepared to dislike it. Couldn't help myself, however, it was too well done.

To get back to the Conference: Hadleigh Seaborne, General Secretary, did himself proud with the smooth-working arrangements. Only contrary comment was to effect that there wasn't enough time for play. Hardly an original complaint from Conferees; I think I've heard the same thing before.

Names of nice people we met are just about too numerous to mention. Retiring president John Veale and new President Rowland Cobbold are credits to I. Pl. E. Met several of the men we had had the good fortune to entertain at dinner here in the States.

English countryside is beautiful but it rained most of the time. Reason, as one Englishman put it: "It doesn't rain any more here than it does in the States. Just takes longer to fall."

Best feature of English roads is string of "cats' eyes" down center of highway. It's far superior to our white line; you can follow direction of highway far ahead, at night. Not having to contend with frost heavage, English roads are in excellent shape. Even the little country lanes are well surfaced and smooth. Worst feature: Continual winding. The straightest roads in the country are those laid out by old Romans. They had lots of slave labor; didn't mind using it, either.

Engineering management, what to do with people and best way to do it, seems to be one of leading problems in Great Britain. Manpower shortage is really beginning to hurt. On the whole, however, Great Britain has recovered to the point where she can once again start counting her many blessings: Sturdy people; a tradition of craftsmanship; equable climate; and, at long last, money in the bank.

Battersby Hats, one of the plants I went through, is a good example of the high standards and craftsmanship for which Britain has long been noted. The most minute flaws, unnoticeable to the average person, are enough to keep a hat from wearing the Battersby label. For example, the number of stitches joining the ends of the leather band is an established number—I forget the number. If there is one too many, or one too few, the hat is not up to standard. Jack Lee, Chief Engineer, took us through this plant.

Lionel G. Northcroft's Spirax, Ltd. had a lot to do with our enjoyment of England. Jerry and Dorothy Chambers, Fred and Catherine Roberts, Sedon and Bertha Brundrit, Madge and Jack Carpenter, Joan Reeves, Mr. and Mrs. Harold Beumont, Ted Chandler and, of course, Mr. and Mrs. Northcroft, did everything in their power, (and the power was high) to make our stay productive, interesting and enjoyable.

I saw many products, well known to American consumers, in the process of manufacture: Battersby's hats—sold by Brooks Brothers; Ashton Brothers and Company, Ltd., weaving that excellent Sea Island cotton shirting that goes into Hathaway shirts—the man with the eye patch, remember? Jack Scott, Chief Engineer, escorted us.

Fred Gastrell, Plant Engineer at Tootal, Bradshaw and Lee Co., Ltd., (handkerchiefs and neckties) conducted us on the £5 tour through his establishment. He has the place working so well he has only one BIG immediate problem—at least, he mentioned only one. Seems, he says, that during the war part of the plant was taken over by a machine tool operation. Oil sumps, below floor level leaked. When machine tools were removed at end of hostilities the oil soaked wood was covered with new flooring. However, it still leaks through the new flooring. Looks as though all woodwork must be replaced.

Biggest and most modern of all plants I went through was that of Henry Simon, Ltd., Cheadle Heath, Stockport, Cheshire. It even had the longest address. Here, the host was Tom Bradshaw, Works Engineer. Flour mills, all over the world, are the chief product of this concern. Virtual by-products of this company have been several other companies whose businesses include materials handling engineering and equipment; research and development; consulting work and construction.

Maintenance in many English industrial plants is of "preventive" type, with the well-known follow-up cards and property record cards. In other plants maintenance is a catch-as-catch-can affair. Just like at home.

Quality of fuel—coal, of course—economical usage of fuel, elimination of pollution, plus economical heat transfer, are taking much thought in England, these days, as throughout the war. More coal is being mined than ever before, but coming up with it has been slate and all other incombustibles.

As one engineer put it, on the other hand: "These conditions make a lot of people happy. The government railroads are carrying more coal than ever before; the mines are mining more than ever before; the union men are being paid more than ever before. Everybody's happy except us blokes that have to burn it!"

In textiles, particularly where handicraft is involved, the English artisan is the equal of anyone. At the well-known Lee Fabrics in Birkenhead, we were shown around by Mr. J. Armitage, Works Manager. One of the most impressive of all their products was the hand-made tapestry work in both modern and traditional design. They are so rugged that many of them are used as floor coverings in public places.

Not wanting to be the usual omniscient three-week observer, I can only end this rambling report by saying that: We had a wonderful time, in a beautiful country, that needs no sympathy. It's a country where the word "recovery" is a word for yesterday. They are, apparently, doing as well as we are. Their sole shortage, they tell me, is manpower. And when you're short of manpower that means everyone is working; and that means prosperity—usually.

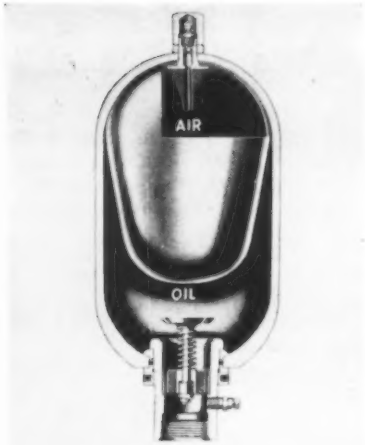


Fig. 1. Cross section of accumulator shows oil in contact with air bladder

Accumulators Rate High In Machine Hydraulics

Pump creates pressure and puts the squeeze on gas filled bladder . . . Energy is stored . . . Application of this idea does wonders in hydraulic machine operations

By **SEYMOUR GARRETT**, Applications Engineer,
Greer Hydraulics, Incorporated

BETTER PERFORMANCE and operating economy can be effected through the use of a simple unit in a machine tool hydraulic circuit. The hydro-pneumatic accumulator, essentially a fluid pressure storage chamber, Fig. 1, has led to the reduction of horsepower and pump requirements resulting in space savings and reduction in heat generation.

While its maximum utility lies in intermittent peak load operations the accumulator can be used effectively to maintain line pressures, overcome excessive leakage, as a power source in secondary circuits and in the elimination of surges within a work stroke.

In many hydraulically operated machines, the working stroke has an initial phase during which load is extremely small. The usual requirement is the completion of the full stroke within a given time which can be apportioned between the loaded and unloaded periods. If, however, a simple cylinder is to be moved by a constant delivery pump driven at constant speed, speed of the cylinder will be practically independent of load.

Hence, the times for the loaded and unloaded portions of the stroke will be proportional to its respective lengths. Under such conditions, it can be easily seen that the peak power required is much larger than that necessary when speed of movement varies inversely as the load. It is assumed that stroke time in the latter case is equal to that during which the constant delivery pump is used.

In many applications, means of operating the machine at higher speeds under low loads must be sought in order to even the power curve and reduce the peak as much as possible. Accumulators can be used for quick approach under low load and with a high degree of pressure economy. A high pressure pump may be used to store potential energy for low pressure conditions by using an accumulator for the volume of the largest cylinder in the system, or of several to be operated simultaneously or in close succession.

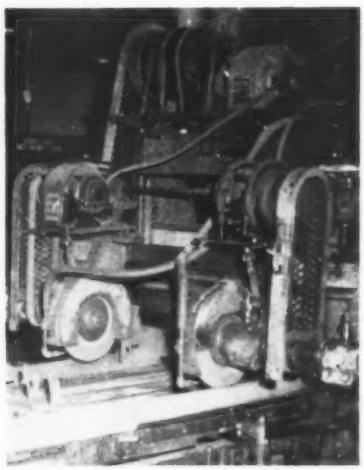


Fig. 2. Grinder table and grinding heads were belt driven before the change

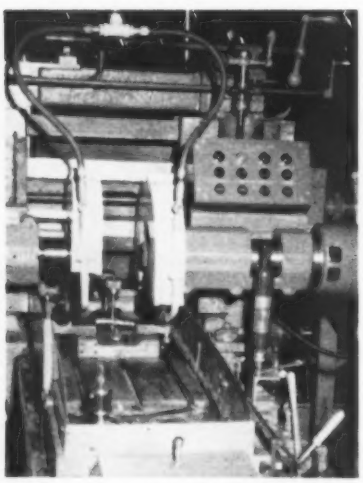


Fig. 3. Converted machine has electronic controls, hydraulic table reciprocation

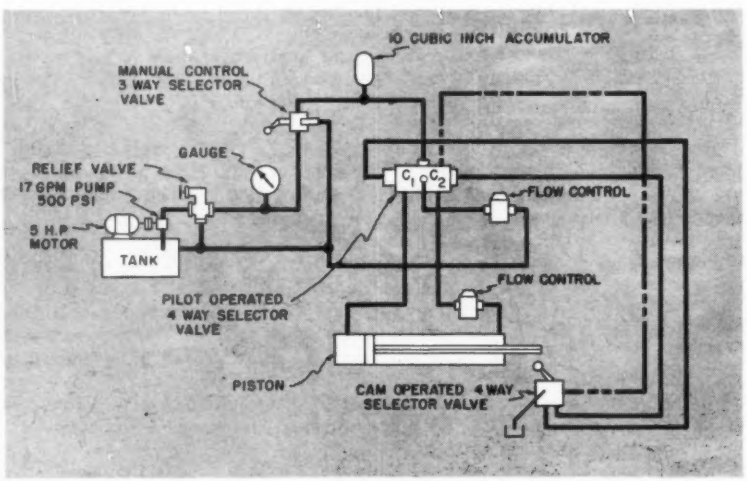


Fig. 4. This is a schematic drawing of hydraulic system installed in the surface grinder rejuvenation process. A 10 cu in. accumulator is used in the arrangement

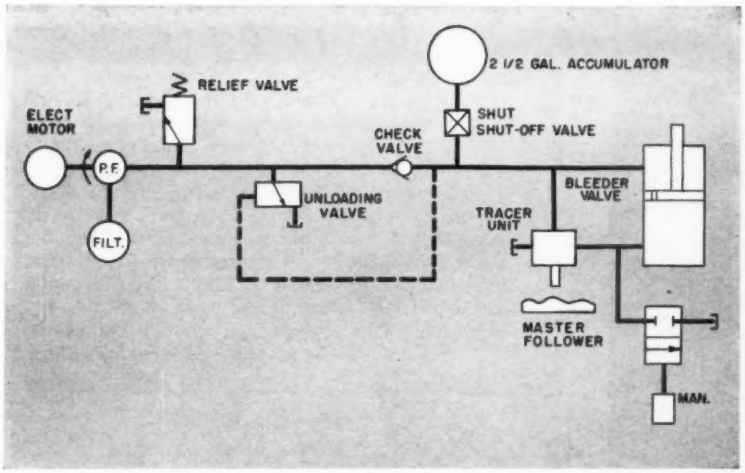


Fig. 5. Hydraulic circuit for tracer unit on duplicating lathe. In case of a power failure accumulator prevents work spoilage caused by cutting tool gouging

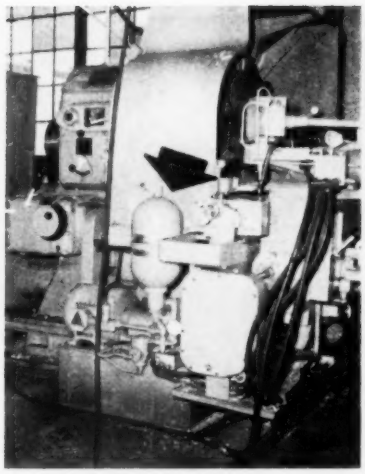


Fig. 6. Accumulator (arrow) mounted on this duplicating lathe pays dividends

The size of the pump is then determined by the time available for recharging, the minimum idling period. In the case of a number of independent services it can be selected on the basis of consumption with a suitable margin allowed to insure that the accumulator will never empty under normal conditions.

First practical application of an accumulator to be considered involves the rejuvenation of an old grinder. The installation of a hydraulic system resulted in a saving of $20,000 and the accumulator played an important part in this by reducing line surges.

Originally, the vertical and horizontal adjustments of the two grinding heads were accomplished by conventional hand screw methods. The grinding heads were belt driven and powered by individual 2.5 hp motors. The belt drive had worn the cone spindles so badly that a fine finish on a work piece was difficult to obtain. This condition was also magnified because of other worn surfaces.

Machine Systems

The reciprocating motion of the table was obtained by means of a screw drive. Positioning was accomplished by disengaging the pulleys with an idling clutch. The drives were powered by an electric motor through a series of reduction gears and the type and amount of work was directly proportional to the capacities of the electric motors.

The rebuilt machine, which is illustrated in Fig. 3, was completely disassembled, reground, parts were refitted, and individual grinding spindles mounted on suitable and accurately honed castings. The mechanical screw drive was eliminated and in its place was a hydraulic cylinder which, with suitable controls, reciprocated the grinding table.

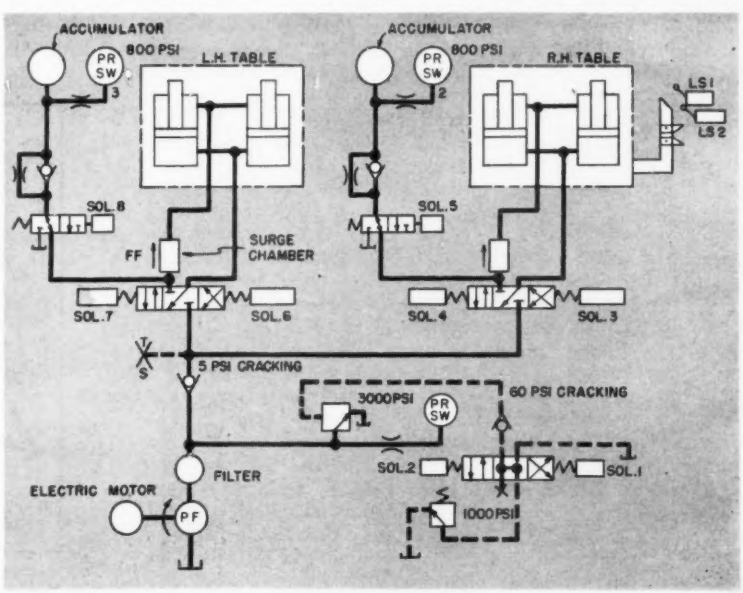
The hydraulic system is shown in Fig. 4. It consists of a power pack with a 50 gal tank and a 5 hp motor driving a pump with a flow of 17 gpm at 500 psi. System pressure is governed by the relief valve. Flow is directed to a manually controlled 3-way selector valve which enables the operator to position the work table for testing and loading purposes. The reaction of the table is instantaneous. A line leads directly from the 3-way selector valve to a pilot operated 4-way closed center selector valve. A bleed port from this selector valve feeds hydraulic pressure to a cam operated valve which when actuated will provide pressure to the pilot heads of the main selector valve.

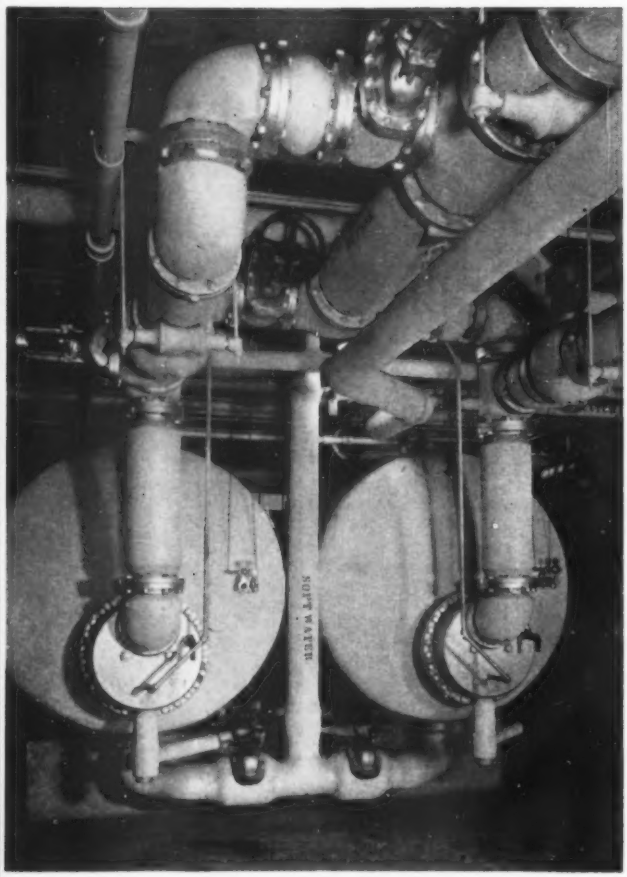
As the table rides back and forth during grinding operations, strategically placed cams trip the cam selector valve allowing pressure to be ultimately placed on the pilot heads of the main selector valve. As long as the manually operated selector valve is open, the above described motion continues automatically.

The one phase that created a problem in this hydraulic system was a phenomenon encountered due to the reversing motion of the table during operation. This motion caused a hydraulic shock which was developed because the hydraulic pressure tending

(Continued on page 150)

Fig. 7. In this broaching circuit accumulators maintain fixture cylinder pressures





GM's New Piping Color Code

This company revised its code and came up with a far simpler, safer, faster, foolproof system of identification by color

OBSOLESCENCE is a term usually associated with equipment; but methods and procedures are also subject to the same laws. Take, for example, the color code for safe identification of piping systems which had, until recently been the standard for General Motors plants.

It had started off as a rather simple, straightforward system based on five colors—aluminum, blue, green, yellow and red—along with black, as background of "Primary" colors. In combination with this, in order to extend its usage, there were selected secondary or "banding" colors.

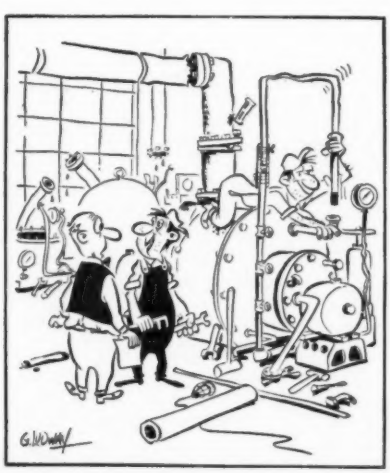
This had the distinct advantage of permitting practically any number of combinations of colors to be used to code the piping systems. At the same time it had the equally distinct disadvantage of confusion. A maintenance man or a pipefitter had to have either: a) a memory like an elephant's, or b) a copy of the standards with him on the job at all times.

Thus the system outgrew its usefulness and its intended purpose. It had to be knocked down to size again in order to recover that usefulness. That's where the new system came in.

The new "Color Code for Safe Identification of Piping Systems" is much simpler, as shown by Table I. It will be noted that although one primary color has been added—orange for "non-flammable hazardous materials"—that the system no longer relies on a great memory for effectiveness. In fact, the color plays a minor part—that of quick identification in a maze of piping. Now the contents of the pipe are quickly readable.

To the code, as it appears in Table I, the following directions are appended:

1. Piping systems shall be identified both by the colors indicated in the Standard (to establish class of materials) and by legible and durable lettering to



Who needs blueprints?!

denote specific contents. This color code does not apply to portable compressed gas cylinders.

2. Lettering may be applied by heat-resistant adhesive bands, stenciling, tagging, or any legible and durable method. Lettering shall be either black or white whichever gives greater contrast when applied to the background color.

3. All piping carrying flammable or hazardous materials shall be further identified by arrows showing direction of flow. Flow arrows are optional for piping systems not carrying flammable or hazardous materials. Loop systems in which direction is uncertain may be identified with arrows in both directions.

4. Air, steam, and high-pressure water lines shall be identified by lettering, together with numbers indicating pounds per square inch, "psi."

ASME Piping Identification

Those readers interested in pursuing the subject further may obtain copies of the ASME Scheme for Identification of Piping Systems. Send 60 cents to American Society of Mechanical Engineers, 29 W. 39th St., New York 18, N. Y. ASME members get a 20 per cent reduction from list prices of all ASME publications.

Table I. New piping color code relies simply on the primary colors with lettering for specific designations

Examples of Contents of Pipe	Class of Contents	Color
Water sprinkler systems, foam systems, carbon dioxide (when used for fire protection only)	Fire protection systems	Red (Fire Red)
Acids, alkalies, process waters (dangerous), toxic materials, oxygen, inert compressed gases	Nonflammable materials hazardous to personnel	Orange (Yellow-Orange)
Gasoline, kerosene, oils, solvents, thinners, fuel gas, propane, butane, hydrogen	Explosive or flammable liquids and gases	Yellow (Lemon)
Drinking water, service water (hot or cold), condensate	Water not hazardous to personnel	Green (Light)
Compressed air (to be labeled: "AIR___PSI")	Air	Blue (Light)
Steam (to be labeled: "STEAM___PSI")	Steam	Aluminum (or light gray)
Electric current (to be labeled: "_____VOLTS")	Electric Conduit	Black

Automatic Traveling Spray Booth

AUTOMATION in spray painting for transportation equipment is the newest development in spray painting equipment. Great Northern Railway Company is the nation's first railroad to install an automatic traveling spray booth designed expressly for the spray painting of freight cars. The booth is located at the railroad's St. Cloud, Minnesota, shops.

Traveling booths have achieved a reputation for outstanding performance in railroad and transit fields during the last few years. These regular booths have been in use for the refinishing of rolling stock and have helped increased efficiency and speed in painting operations.

The new automatic booth operates somewhat like these others but the difference is in the replacement of hand spraying with the installation of automatic transverse coating machines on the sides and a gang arrangement of automatic spray guns on the top of the unit.

At Great Northern, four freight cars are placed in the painting position and the workmen operate the booth. Each car receives two coats of paint on both sides and one on the roof. The ends of the cars are hand sprayed by workmen using extension spray guns. These workmen, who ride inside the traveling booth, stop at each spot where car ends are sprayed. The complete cycle takes 48 minutes, or 12 minutes per car.

The new automatic traveling booth has controls within easy reach of the operator and is equipped with inside platforms which can be raised or lowered to enable the operator to efficiently spray the ends of the cars.

The booth, a self contained painting unit, is equipped with its own compressors, air transformers and a circulating system which has a capacity up to 110 gallons of paint. In addition there are many safety factors including a CO-2 system.

The compactly designed traveling booth eliminates the need for exhausting huge volumes of air from the building along with the high cost of heating comparable volumes of outdoor replacement air, characteristic of the older large booths. The booth was made by The DeVilbiss Co., Toledo.

A railroad freight car in the process of painting is shown here in the traveling spray booth of Great Northern Railway Company

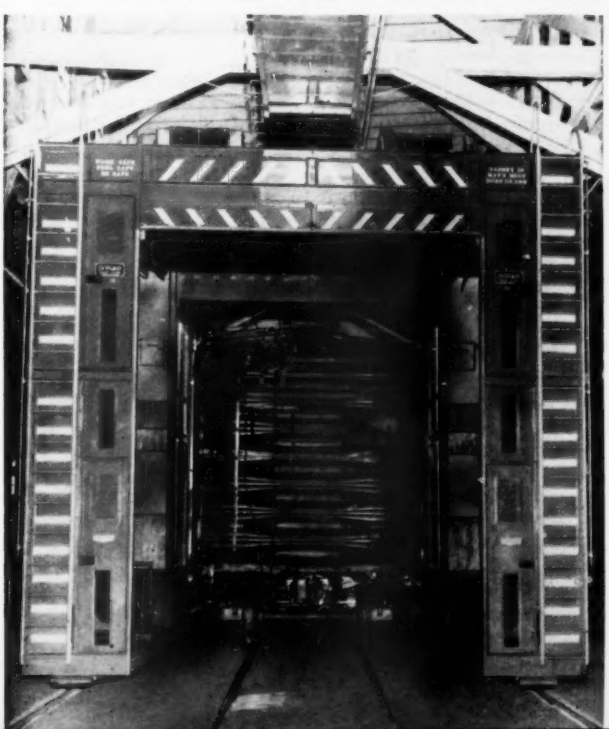


Fig. 1. Here, a drop-bottom box in combination with a positioning stand which holds 25 per cent of the box's contents, provide this operator with a continuous supply of blanks at work height. Stampings slide down chute into second box

Containers, Positioners Up Output for Small Plant

In a highly competitive business this small company has, partly through the modernization of its handling methods, grown from a garage business with 7 employees into a 45,000 sq ft plant with 200 workers producing stampings

HOW CAN A SMALL PLANT supplying component parts to large manufacturers of assembled metal products meet the fierce competition of much larger mass producers?

The Kusic Haines Manufacturing Company of Weirton, West Virginia, is a case in point. This small job stamping plant of 200 employees operates 46 presses two shifts a day. The company produces metal stampings for an average of 15 customers, including major manufacturers of automobiles, radios, and television sets.

This company started business nine years ago with seven employees and four presses in one partner's garage. Three years ago the company moved into its new plant—a structure of 45,000 sq ft of floor space. In the last two years 26 presses have been added, eleven last year alone. An additional 18,000 sq ft of floor space are now under construction.

Kusic Haines meets competition from much larger plants often more favorably situated market-wise. The company's success has depended largely on turning out stamping of narrow tolerances at low production costs and at a high rate of output per machine.

A modern and flexible system of materials handling, well suited for the changing requirements of a job shop, has helped greatly. Today a continuous reservoir of parts is work positioned at the presses by two or three materials handlers and a fork truck operator. These three or four men supply 46 presses; yet two years ago they were kept equally busy supplying only 20 presses.

How this one firm has achieved high hourly output per machine, and kept downtime at a minimum, is no trade secret. The answer simply is sound and progressive management providing the proper tools to keep production flowing.

Two years ago, the plant had no standard handling system. All kinds of containers were used—small shop boxes and trays, drums, tubs and cardboard cartons. Materials handlers had to bring small container loads of parts to each press several times a day. Ma-

chine downtime caused by delays in material supply averaged half an hour per machine per shift.

Further production time was lost because machine operators generally had to stoop and stretch to reach parts in the makeshift containers. Resultant operator fatigue probably exerted its adverse effect upon output, too.

Against this background, and with production steadily climbing, management began the job of selecting a handling system. The company standardized on drop-bottom boxes and positioning stands made by the Union Metal Manufacturing Company of Canton, Ohio.

Kusic Haines felt the flexibility of this container system would best serve the changing production runs of their job stamping operations. Work-positioning was needed to increase machine output. Tierability of the boxes was desirable to release floor space badly needed for expanding production.

Initially, the company purchased 50 boxes and a couple of stands. They made three additional purchases of 50 boxes and several stands as production increased.

Versatile Equipment

Today, Kusic Haines handles 85 per cent of its stampings with 200 boxes and several stands. When one press run is completed, boxes and stand are fork-lifted to another press—in other words, quickly shifted around the plant to meet production requirements. The same box is used to feed parts into the stand in work positioning, to receive stampings ejected from the presses, and for compact in-process storage.

The corrugated steel boxes have a hinged drop-bottom made of a single sheet of quarter inch steel plate turned up at the sides to form a chute. Each box accommodates 6000 lbs in a volume of 20.2 cu ft.

Front legs of the positioning stand are recessed under the work-level tray of the stand for closer positioning. An adjustable vertical control gate regulates parts flow according to piece size. The stand's tray holds 25 per cent of the box contents—more than enough to supply the operator while an empty box is being replaced.

Kusic Haines generally fork-lifts a box into a stand, although a crane is used in a couple of inaccessible locations, or when fork trucks are occupied elsewhere. When a fork truck is used, the driver lowers the box into the stand until a front angle on the box engages a horizontal angle on the stand, and the hinge-end of the box rests on the stand's rear supports. As he withdraws his forks, the hinged drop-bottom of the box opens, discharging parts into tray of the stand.

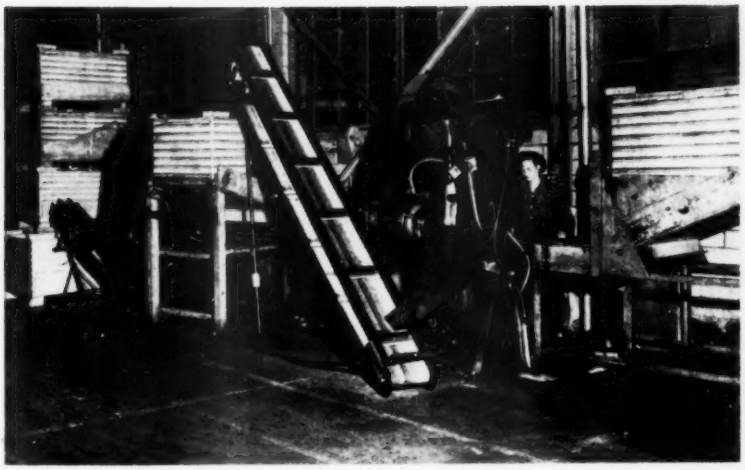


Fig. 2. Flexible production line is set up with the drop-bottom boxes and positioning stands, and portable roller conveyor belts on a multiple press operation. Stampings are air ejected from first press, slide down chute onto conveyor

Kusic Haines has realized several important advantages with the boxes and stands. Their continuous reservoir of parts has completely eliminated machine downtime resulting from delay in materials supply. Tiering of the loaded boxes four high for in-process storage produced savings in floor space of at least 40 per cent. Probably the greatest advantage of all has been increased output gained through work positioning. Press operators pick parts from the work-level tray of the positioning stand, instead of stooping and stretching to reach material in drums, tubs, or other containers.

For example, on one press operation, radio voice coil holders are formed with only one hit of the press. Without the positioners the operator turned out only 608 pieces per hour. With parts positioned at work-level height, output is 677 pieces, an increase in hourly production of 11.3 per cent.

Another example of increased output is a piercing operation on shifter-shaft levers for automobile transmissions. When the press operator had to reach into a box or tub for levers, her output was only 826 pieces per hour. Now, picking pieces from the work-level tray of the positioning stand, she turns out 1023 levers, an hourly production increase of 23.8 per cent.

When press output increases of 20 per cent or more per operator shift are added up for all presses utilizing the positioners, called Work-O-Matics, the production boosts Kusic Haines has achieved with this handling system become apparent.

Even greater increases have been obtained on multiple press operations, where, for example, blanking, forming and piercing are all performed on a given stamping. If three presses are involved, Kusic Haines places positioning stands and drop-bottom boxes at each press. The boxes and stands are used as hoppers, portable roller conveyor belts carrying parts from one press to the box on the stand at the next press, and finally dropping the finished stampings into a Work-O-Matic box at the end of the line.

This small job stamping plant derives important competitive advantages from standardizing on a modern container system geared to its own needs. Work-positioning greatly increases operator output. A continuous reservoir of parts eliminates machine downtime resulting from gaps in material supply. Compact tiering of containers produces large savings in storage space. Kusic Haines gains these benefits while holding materials handling labor costs to a bare minimum.

Comparison of two material supply methods for punch press operation on levers

Method	Hourly Production	Production per 8-Hour Shift	Productive Time per 8-Hour Shift	Downtime for 8-Hour Shift
Working from Barrel	826 levers	5,369 levers	6½ hours	1½ hours
Working from Box and Stand	1,023 levers	7,161 levers	7 hours	1 hour
Advantages of Box and Stand	Up to 23.8%	Up 33.3%	Up 7.7%	Down 33.3%

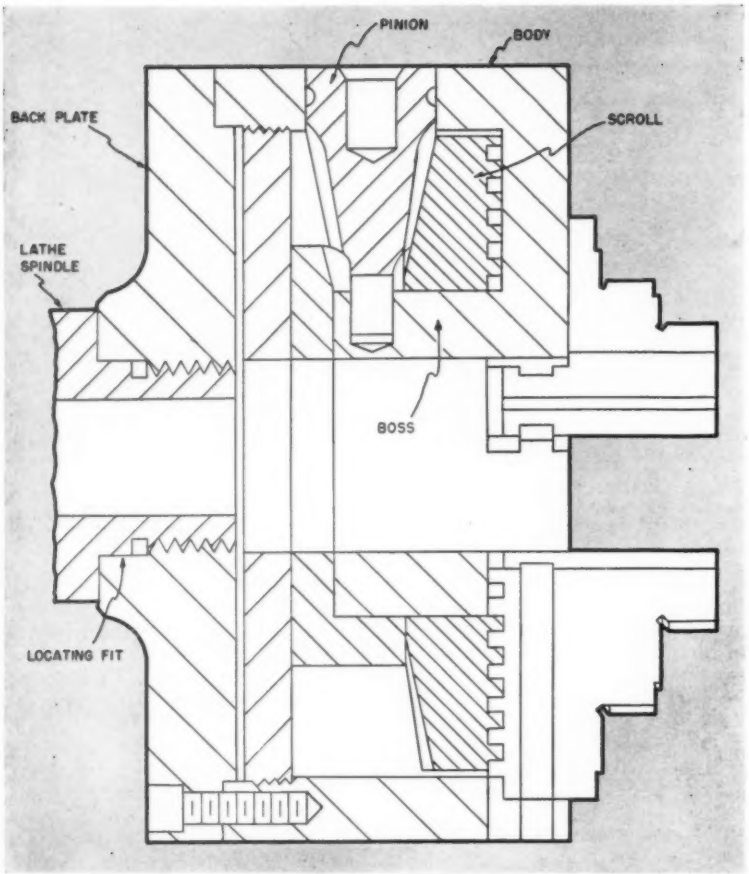


Fig. 1. Cross section of typical universal or self-centering chuck construction

Universal chucks are extremely useful tools... Their accuracy depends upon their treatment . . . Author tells testing and maintenance procedures in detail

Operation and Care of SELF-CENTERING CHUCKS

By F. E. RILEY, Mechanical Engineer

SELF-CENTERING CHUCKS commonly known as universal chucks or three-jaw chucks, are available in body diameters ranging from 3½ to 24 in. The three-jaw chuck has achieved a standard constructional form which varies from maker to maker only in the proportions of its various parts.

One of the main advantages of the self-centering chuck is the fact that it will grip a circular piece of work concentrically with the chuck body center line, within very small error limits. It can be used on lathes, grinders, and milling machine dividing heads or built into jigs and fixtures. When plant engineers are looking for a work holder which will grip a wide range of work diameters concentrically, the self-centering chuck will often prove a cheaper solution to a holding problem than the fabrication of special work holding devices.

Eccentricity Test Certificate

New chucks are often issued by the manufacturer complete with a test certificate giving maximum eccentricity when gripping various work diameters. Some diameters run dead-true, while others run eccentrically. It will usually be found that the maximum run-out does not exceed 0.002 in. This maximum tolerance on eccentricity is about the best which can be maintained in competitive manufacturing.

The difficulty of reducing eccentricity errors will be appreciated through study of the section view of a fairly representative type of self-centering chuck, shown in Fig. 1. The body is of cast iron or semi-steel, having an integral internal boss on which is mounted a revolving scroll. The running clearance between boss and scroll bore is the source of some eccentricity troubles encountered in chucks. The scroll is revolved on its bearing by any one of three pinions spaced equally around the body and having bevel teeth for engagement with those on the back of the scroll. The front face of the scroll carries a continuous spiral groove which meshes with arcuate teeth on the back of each jaw. With this multiplicity of sliding

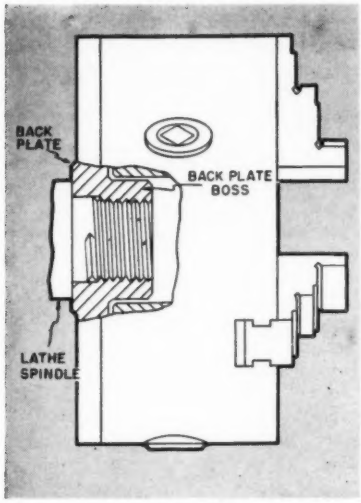


Fig. 2. With back plate reversed, lathe spindle extends into chuck for stability

surfaces in the average chuck, concentricity within a tolerance of 0.002 in. is no small achievement.

Figure 1 shows the most popular method of mounting the chuck on the lathe back plate. In machining the threaded hole in the plate for engagement with the spindle nose of the lathe, the locating fit between the plain diameter on the nose and the mating bore on the plate must have minimum clearance. The thread can be a loose fit, as it serves merely to pull spindle and plate into engagement with one another. Excessive clearance between spindle and plate will preclude repeatable accuracy during consecutive chucking operations.

It will be noted from Fig. 1 that the male register on the back plate engages with a recess in the back of the chuck body. During manufacture, it is feasible to machine this recess, the outside of the body and the internal scroll bearing, all at one time, insuring concentricity of all three parts. Therefore, if the outside of the body adjacent to the back plate recess is running dead true when mounted on the spindle, the mounting of the chuck is correct.

Close Fit Between Parts

To eliminate possibilities of error, the back plate register should fit the chuck without clearance between the mating circumference. The two parts should snap together neatly. When the back plate has been fitted correctly to the spindle and to the chuck, there should be no perceptible eccentricity shown by a dial indicator riding on the outside of the revolving chuck body. Testing the body concentricity should be sufficient indication of correct chuck mounting.

In fairness to the chuck manufacturer, attempts to "indicate" odd bars gripped in the jaws should duplicate as nearly as possible the maker's test conditions. This involves the use of hardened and ground test bars which make full-length contact with the chuck gripping surfaces. Most bright steel bars are neither sufficiently round nor straight for use as test bars.

Choose Maximum Size

In order to reduce costs, many users order chucks which are too small for the machine to which they will be fitted. The biggest possible chuck will be very useful for holding all circular work within machine capacity and will avoid much expensive truing of large diameter pieces. On a lathe having normal swing for its general size, the chuck selected should grip a piece of work of diameter equal to the chuck body diameter, the jaw tops just clearing the lathe bed.

Another advantage to be gained from using the maximum size of self-centering chuck is the ability to reduce overhang beyond the spindle nose, by fitting the back plate "in reverse" as illustrated in Fig. 2. Here, the back plate boss and the spindle nose are housed within the bore of the chuck body, bringing the weight of the chuck nearer to the spindle bearing, thus reducing chatter and vibration considerably.

The back plate mounting method of Fig. 2 is so beneficial to small lathe efficiency that bore sizes should be considered in preference to body diameters when planning a chuck purchase. The bore size should be sufficiently large to accommodate a back plate boss having an adequate wall thickness around the lathe spindle nose.

One of the pinions on a chuck will be marked by a small "o" or an arrow. This is the pinion used by the maker when compiling his test chart and is the one which gives the best all-round concentricity. The reason why the pinion used for tightening the jaws affects the concentricity may not be apparent, but it can be seen from Fig. 1 that if the pinion shown is used for tightening, it will tend to force the scroll in a downward direction, a distance equal to the clearance in the bearing. The jaws will also be carried along with the scroll so that the jaw opposite to the tightened pinion will show a high spot.

Old chucks with excessive slack in their scroll bearings can often be improved by tightening with various pinions until a reasonably concentric grip is obtained. Another expedient for truing work in old chucks is to insert paper packing between the work and the jaw adjacent to the high spot of eccentricity. When inserting paper packing, the same pinion must be used each time the jaws are tightened. Any work trued by either of the above methods should be subjected to light finishing cuts only, as heavy roughing will shift the jaw and scroll assembly.

Grease Keeps Bearing Clean

Slack in the scroll bearing is one of the most serious causes of rapid chuck deterioration. Because of its position, cutting lubricant and fine swarf particles penetrate the bearing and usually wear down the soft cast iron of the boss. When a new chuck is put into service, wear of the scroll bearing can be reduced by packing the chuck interior back of the scroll with a heavy grade of grease. Grease prevents ingress of liquids and fine swarf, when packed into the body at high pressure. One way to accomplish this is to insert a grease nipple into the body so that a high internal pressure can be built up, as illustrated in Fig. 3. The nipple is sunk into a recess so that it does not present a projection hazardous to the machine operator.

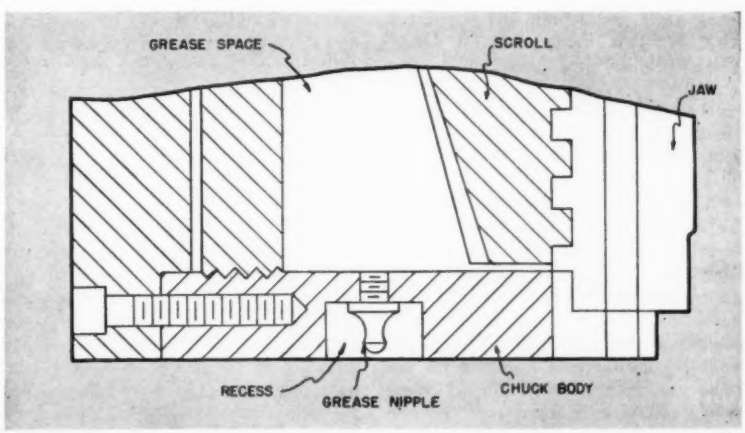


Fig. 3. Cross section of chuck segment shows method of installing grease fitting

Periodic greasing will raise the internal pressure within the chuck body, forcing grease out of the scroll bearing, carrying away any particles of swarf which may have penetrated.

Excessive wear and clearance in a scroll bearing can be taken up by turning down the boss in the body and building up the scroll bore to fit, by nickel depositing. Care must be exercised to maintain the new scroll bore concentric with the scroll path. Truing up the old bore surface and grinding the outside periphery of the scroll will provide a datum surface for machining after plating.

Wear in jaw slides is surprisingly small, but when it becomes objectionable and causes the jaws to twist under pressure an attempt can be made to take up the slack. This is done by annealing the jaws, which are of case-hardened steel, and peening over the slot edge with a hammer, as in Fig. 4. The slot is then ground to correct width to fit the tongues in the body, after re-hardening.

Re-grinding of the jaw gripping surfaces is often attempted in the machine shop—usually unsuccessfully, due to imperfect loading of the jaws during grinding. The jaws must be held in the positions they will assume when gripping a piece of work. For instance, when grinding the bar-gripping edges of the jaws shown in Fig. 5, it is useless to hold a ring on the exterior steps. This will load the jaws in the wrong direction and the jaw teeth will be in contact with the wrong side of the scroll groove.

Washer Gripped for Alignment

A good method of grinding the bar-gripping edges is to load the jaws by gripping a recessed washer in the first teeth on the backs of the jaws, as shown in Fig. 5. A grinding wheel can then traverse the full length of the gripping faces while they are held in loaded position. The outside steps on these jaws are ground by gripping a ring by their outer ends. A set of plate-gripping jaws are loaded for grinding by gripping a narrow washer in their inner ends. Rings and washers for loading are placed as close as possible to the body front face so that they are near to the jaw slots.

A universal grinding machine can be used for regrinding jaws if the body is bolted to the grinder work head face plate and its exterior set to run concentrically by means of a dial indicator. Most regrinding is done with the chuck mounted on the lathe spindle and a grinding unit mounted on the tool post. Either way, the grinding wheel should be worked over the jaw surfaces until the sparks have died out completely, to insure that any spring in

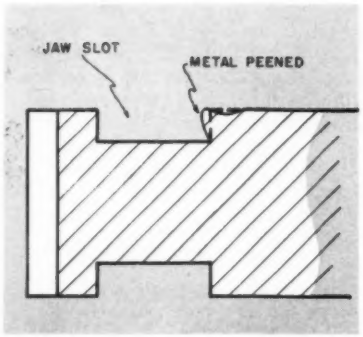


Fig. 4. To restore slot clearances, edges are peened over and reground to size

chuck or grinding spindle has been removed.

Test the chuck for true gripping by mounting truly circular and smoothly finished work pieces in the jaws and pull the work around by hand, observing the movements of a dial indicator bearing on the test piece. Use one pinion for tightening and grip a range of test piece diameters in succession, noting the jaw number where the high spot occurs and the extent of the eccentricity in thousandths.

It is best to make a rough table of the indicator readings obtained on various diameters. If a high spot occurs between two jaws, make a note of their numbers. At the end of the first test the list may reveal that the maximum eccentricity on all diameters is 0.002 in. and that this occurs between jaws *2* and *3* on one diameter while some other diameters have their high spots adjacent to jaw 1. Such a result shows that the grinding is perfect. If metal was removed from jaw 1, its eccentricity figure would be increased to about 0.003 in. while the eccentricity on another diameter between jaws *2* and *3* would be reduced by 0.001 in.

When one jaw is adjacent to the high spot throughout the various diameters gripped in the test, a little metal can be ground off the two opposite jaw surfaces to reduce it. Grinding of one jaw only is accomplished by manually rocking it under the grinding wheel.

Change Pinion Marks

A persistent high spot near one jaw can often be reduced by using the pinion opposite to it for tightening the test pieces, as explained previously. If the new pinion gives good results, rub out the mark denoting the old true pinion and mark the new one.

When testing bar gripping jaws, the indicator should reveal parallel results at points along the bar. A high spot which changes its position on the bar periphery at the overhanging end of the bar, or which changes its magnitude, reveals that there is twist in the gripping surfaces. This condition can often be corrected by lapping with abrasive compound placed selectively on a jaw.

When batch work with numerous second operations is to be done in a chuck, it is advisable to purchase an extra set of soft steel jaws with the chuck. These can be used for a long time if a surface cut is taken periodically, to suit the work diameters to be gripped. They are as good as collets and much cheaper, particularly on large-diameter gripping.

Servicing of chucks should include periodic cleaning of jaw teeth and the scroll thread by brushing and kerosene. Thick grease should be applied to jaw slides and the scroll but the amount should be kept to a minimum as it tends to be messy when flung out of the chuck by centrifugal force.

Don't Overload the Chuck

It should not be necessary to increase the chuck key leverage by fitting pipes to the handles. If the chuck will not hold the work, then the work is too heavy for it and a four jaw independent type should be substituted. A tool will not maintain concentricity on a wide range of diameters if subjected to brute force and ignorance.

In cases where the majority of the work mounted in the lathe is truly circular, it is good practice to stock two self-centering chucks, instead of the standard complement of one 3-jaw and one four-jaw. One self-centering chuck can be used for rough work, and the other can be preserved for accurate machining. Time-saving advantage of the rough self-centering chuck is that it grips work "on center" easily.

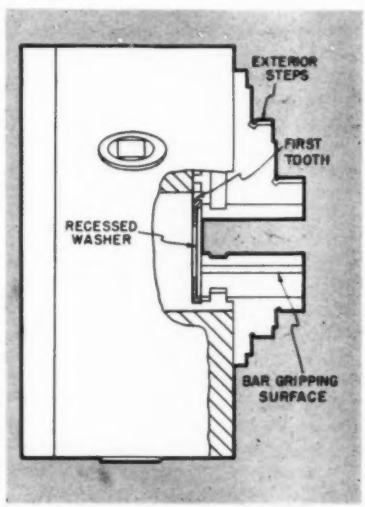


Fig. 5. Indented washer gripped in jaws gives load effect, to align edges

"Washing Machine" Ceilings

Here's a corrugated, light-weight plastic ceiling that completely hides all sprinkler equipment, piping and structural work, yet is approved by Underwriters. It is easily and quickly installed, and just as quickly removed for washing—in a washing machine just made for the job

By J. R. SHERIDAN, Engineering Manager, Davis & Geck, Inc.

APPLICATIONS FOR plastic materials have broadened in scope beyond all expectations within the last decade. Not the least of these are the plastic ceilings now being installed throughout the country in plants, offices, schools and other public buildings—wherever the original ceiling heights will accommodate the plastic. They are also appearing as routine installations in many new buildings. One of the largest such installations so far attempted is in our company's new plant in Danbury, Connecticut. This company, a unit of American Cyanamid Company, manufactures sutures and other surgical specialties for the medical profession.

To date, most plastic ceilings have been installed in offices or drafting rooms, but Davis & Geck has put them in all offices as well as the major portion of the manufacturing area of the plant, 51,000 sq ft of floor space.

Fig. 1. For easy access to pipes and duct work the ceilings need only be rolled back. In this photo the plastic ceiling is shown fitting around an air diffuser

This plastic ceiling, which was installed by Luminous Ceilings, Inc., of Chicago is a corrugated, translucent, copolymer vinyl plastic compound, almost paper thin. The amplitude of the corrugations is 5/8 in. and the frequency 1-3/16 in. It rests on inverted T-beams of 20-gage steel, hung so that the plastic material is 24 in. below the light source of fluorescent tubes, the sprinkler system, pipes and beams.

These plastic ceilings carry the full approval of fire underwriters. The material, which is fire resistant, loses its corrugations in about 2½ minutes at a temperature of 140 F and drops to the floor where it presents no hazard. It is out of the way by the time the sprinklers come on at a temperature of approximately 165 F.

All possible surfaces above the plastic were covered with a white bonderized paint, which is a reflectance factor, and all possible areas were also sealed to minimize dirt leakage.

Below the plastic ceilings are sound control baffles or 26-gage prime steel, 1 in. wide and 4 to 6 in. deep, with ½-in. diameter perforations, filled with an acoustical Owens-Corning Fiberglas pack.

The strips of corrugated plastic, which may be 3 ft in width and as much as 25 ft long, lie flat on the metal tracks and are fastened only at the ends by fusible plastic rings. Thus, the strips may be easily lifted out if anything above this ceiling needs attention. Both strips and baffles are easily removable for cleaning.

Even with dust control measures and every precaution taken against dirt, the plastic ceilings will become soiled. Machines are now provided for washing the plastic strips. Some plants own these, others rent them. Luminous Ceilings is now planning a mobile unit which will call on owners of plastic ceilings who have no washing facilities available.

Davis & Geck do own a machine

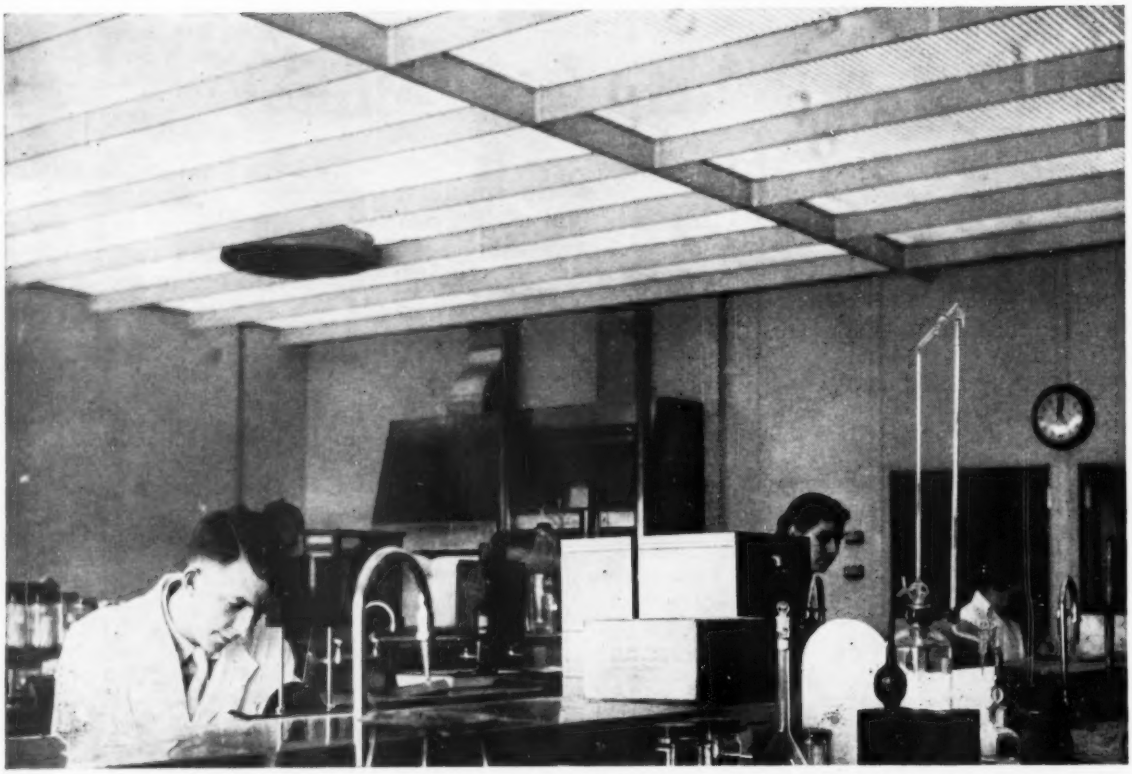
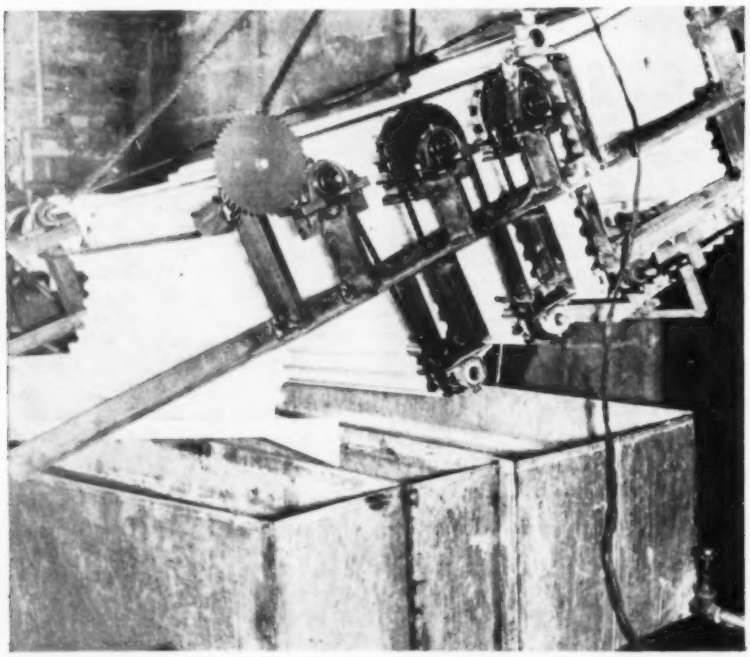


Fig. 2. Diffusion of light is of great assistance to workers at Davis & Geck pharmaceutical plant in Danbury, Conn.

and the ceilings are taken down and washed often. It is a simple procedure. Strips are quickly removed in rolls and placed in the washing machine.

These machines are in a series of three tubs or tanks. The first tank contains a solution of a synthetic detergent in water of 100 F temperature. Here the strips are scrubbed by reciprocal action brushes, the long way of the corrugations, and passed over a metal roller into the second tank, which is a cold water rinse. The strip then passes over another metal roller into the third tank which contains a wax solution, which re-destaticizes the plastic against dust attraction and any negative charges that might develop. From the third tank it passes onto a small platform from which it may be picked up in a roll and replaced and spread flat in its ceiling channel.

Fig. 3. Motor-driven washer has three stages for washing, rinsing and re-destaticizing of plastic ceiling material. It was designed especially for this job



The sound control baffles may be wiped off, thus cleaning them in position, or they may be easily removed for this purpose. Warm water and a detergent, or a special cleaning product, are advised for this work.

A ceiling usually needs cleaning about 18 months after its installation. About four men are needed to do the job—two working on ladders to take down the plastic, one working on the washing machine to feed in the plastic, and a fourth man working between the men on the ladders and the man on the machine. The cost of cleaning the ceiling in the specially constructed washing machine is about two cents per square foot at the most. Davis & Geck hope to be able to cut this cost in half. Plastic can be taken down, cleaned and replaced in a single weekend. No time is lost and there is no interference with business operations.

Anticipate production needs with reliable electric power distribution

Meet H. G. "Barney" Barnett, Westinghouse Power Distribution Engineer, who points to 3 ways Westinghouse can help you by . . .

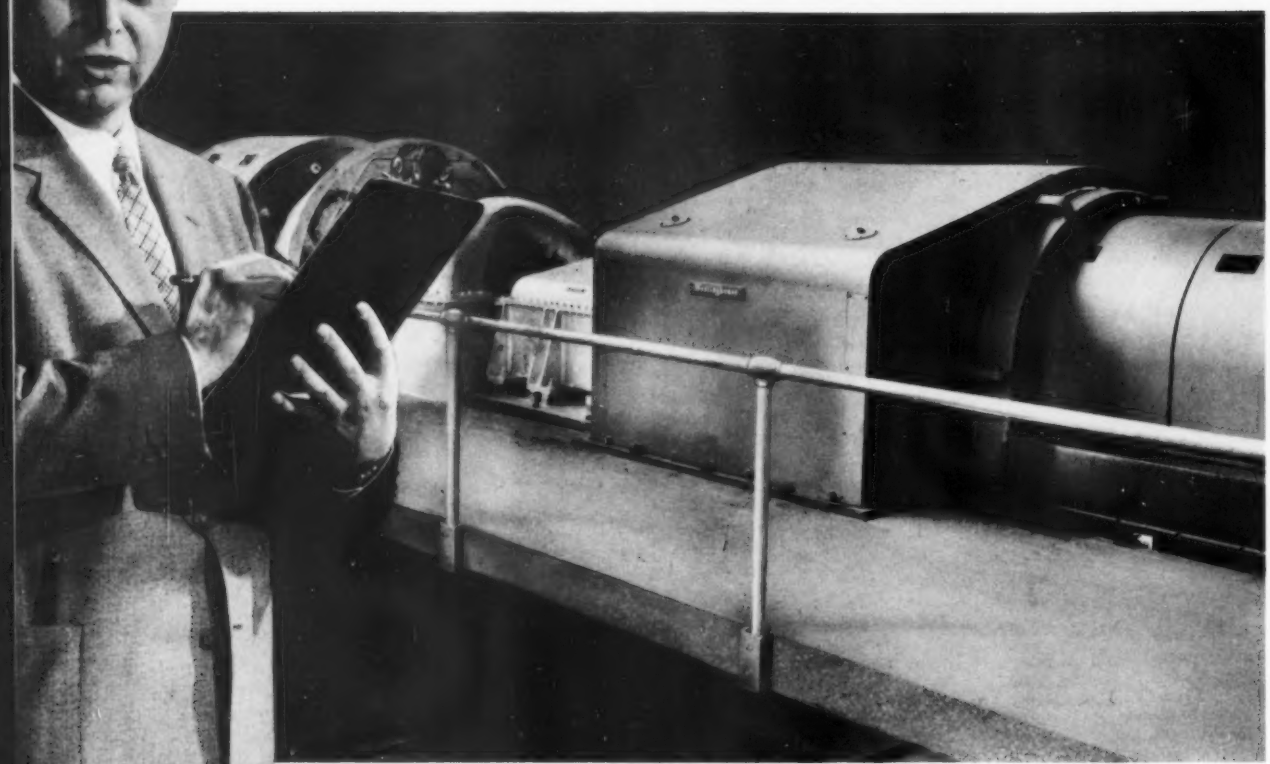
1. **Expanding power facilities**
2. **Engineering power distribution**
3. **Getting power to the load more efficiently . . . and by providing field service in depth**

In the face of changing production lines and increased machine capacity, you may feel like you're asked to "catch and play shortstop" to maintain reliable power distribution. It's an even tougher problem today with competition requiring more efficient operation . . . fewer power failures.

The answer to these problems in your plant may lie in a modernization or an expansion of one section of the power system or in a complete redesign of the system. Whatever the case, Westinghouse can field a team of experts to help in the early planning stages. They follow through, too, in coordinating the design, engineering, manufacture, delivery and installation of all the electrical equipment you'll need to do the job. Let's take a look at some answers the Westinghouse team can provide you with to improve power generation and distribution.

Next page, developments in expanding reliable power
Page 1 of 8 in this section

Whether installed by itself, or in conjunction with an existing power plant, Westinghouse Gas Turbine Power Plants are proving to be flexible, dependable prime movers . . . simple to install and operate.

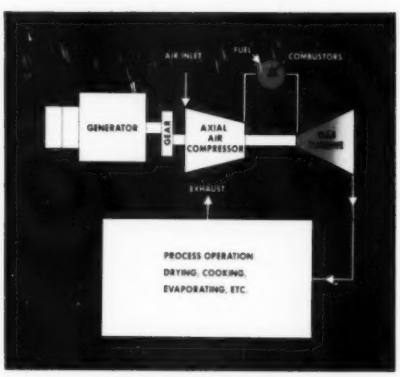


Gas turbines provide dependable industrial power generation

Westinghouse Gas Turbine Power Plants offer a proved, reliable way to meet your expanding power needs. When installed in an existing plant, generating capacity and over-all plant efficiency can be greatly improved at the same time. This is especially true when you use the gas turbine exhaust for feedwater heating, supplying combustion air, or supplementary steam generation in a waste heat boiler.

Available in standard ratings of 1250, 3500, 5000 and 15,000 kw, Westinghouse Gas Turbines are easy and inexpensive to install, requiring only a light foundation and very small floor area. They're equally simple to operate, needing minimum personnel and maintenance. These are some of the sound reasons why gas turbines eliminate many of the problems attendant to other power generation methods.

Before you select any generation equipment, get all the facts from your Westinghouse Salesman.



Installed independently, the Westinghouse Gas Turbine Power Plant becomes a dependable single source for both electric power and large quantities of process heat.

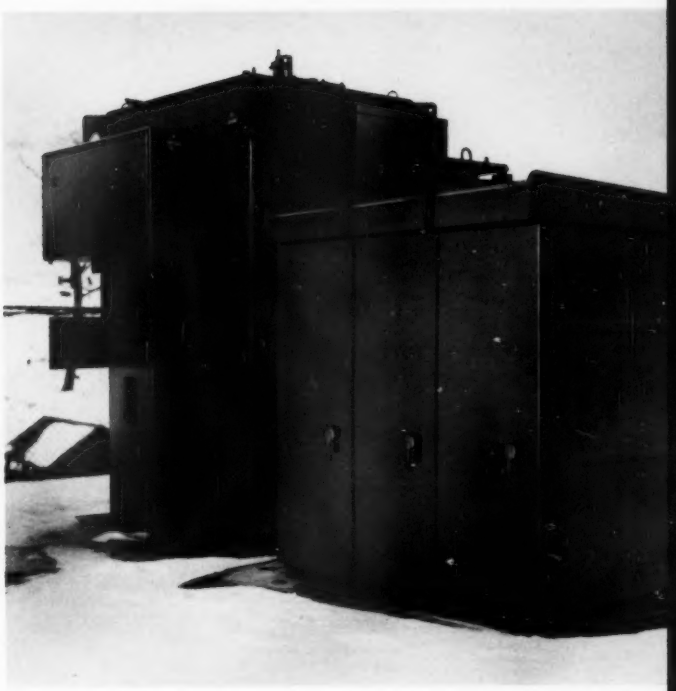
Unit substations easily expand system protection

Let's look at how you receive electric power at your plant. Too often the transforming and switching ability of this vital link is not flexible enough to afford protection that is able to grow with plant needs. That's why Westinghouse Unit Substations offer a very fundamental answer to continuing power distribution protection.

First, the load capability of the unit substation can be readily adapted to accommodate load growth and shifting load centers. Addition of a feeder is a simple matter of adding the compact switchgear unit. A transformer can be changed out readily when necessary. An entire substation can be moved easily and economically, too, with minimum disturbance to service and no sacrifice of protection.

Second, installation is simple. All you have to do is lay a foundation, throat-connect cubicles to the transformer, and tie in feeders. Savings in time and labor are substantial, compared with field-assembled equipment.

To sum it up, the Westinghouse Unit Substations provide the flexibility and dependability vital to protecting the present load as well as future changes in load requirements. They are the first step in assuring you the greatest return and long-time usefulness from your system investment.



Westinghouse Unit Substation Transformers and High-voltage Switchgear are engineered to work and fit together from the design state through manufacturing.

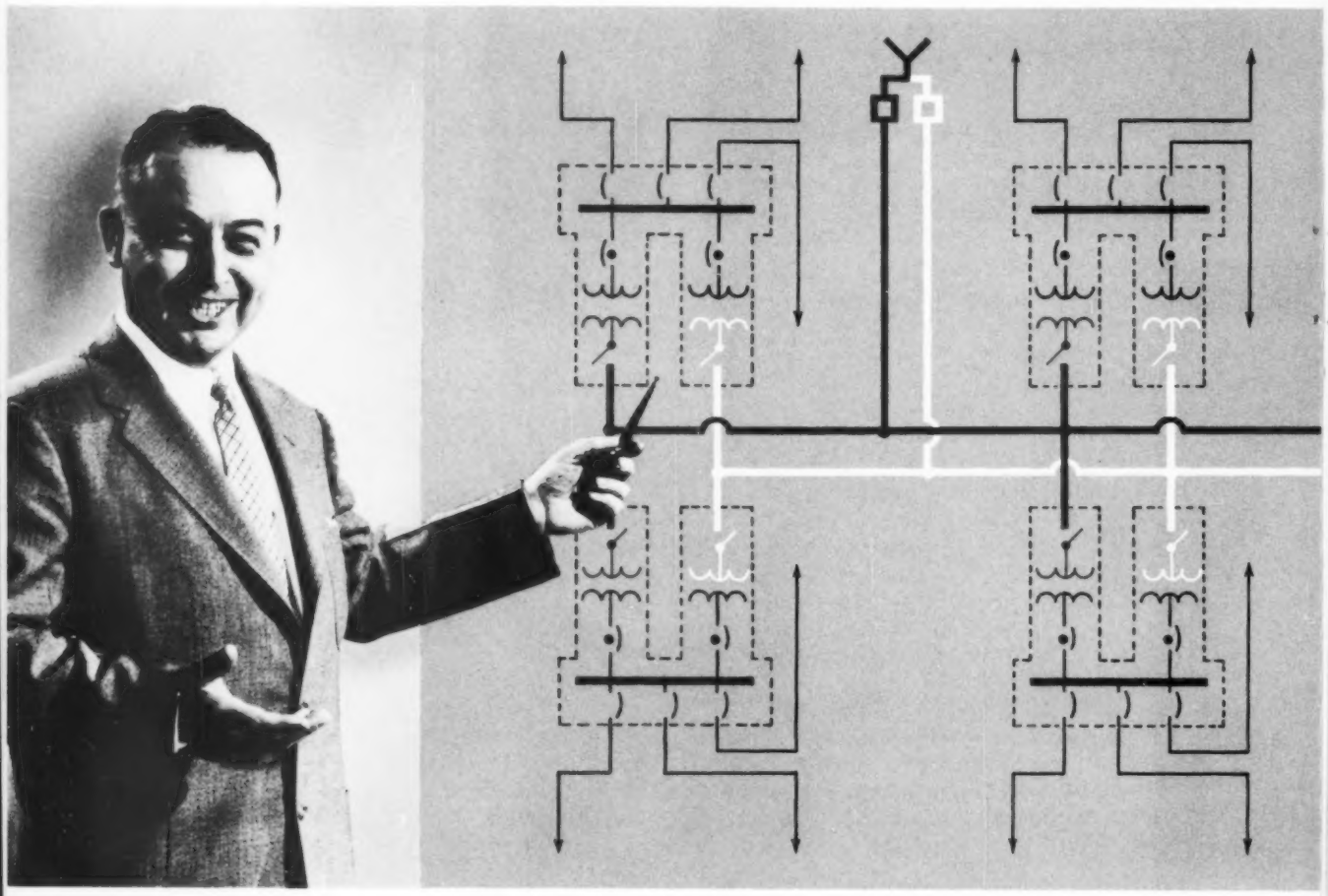
For service continuity, replacement of breakers is only a matter of minutes in Westinghouse Standardized Metal-clad Switchgear. High-voltage DH, De-ion® breakers draw out horizontally. Breaker units in the same voltage classes are interchangeable to provide adaptability to growing load.

YOU CAN BE **SURE**...IF IT'S

Westinghouse

Next step, engineering system reliability . . .

In this simple spot network system a primary feeder or transformer fault is automatically localized. In the event of a fault on one feeder (white), the other feeder and transformer (red) take over the load. Service continuity is maintained.

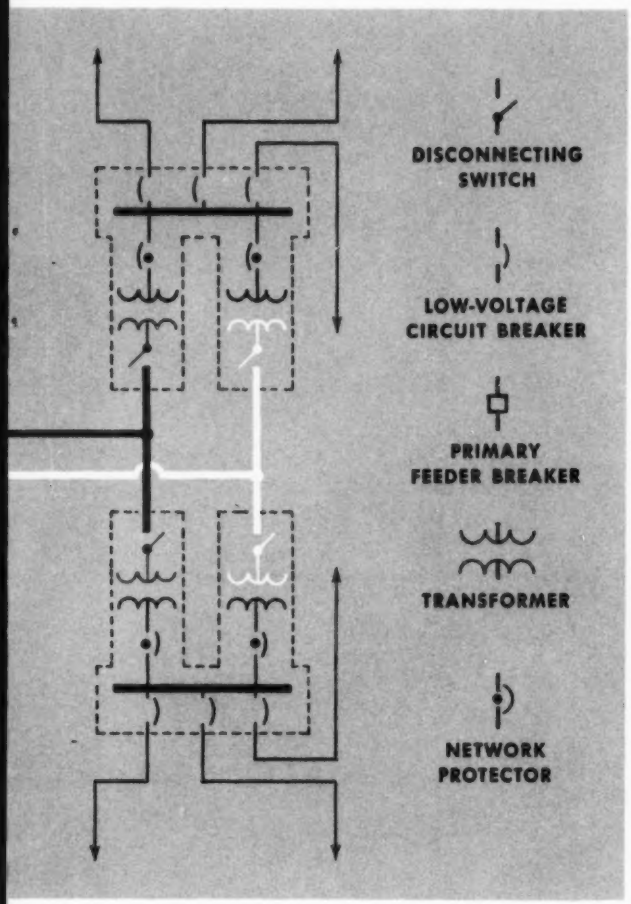


Coordinated equipment gives you more protection per dollar

If you're questioning how to get more dependable power distribution, let me suggest one way . . . a network system. Why? Simply because a network divides the load responsibility among power centers that, grouped together, form the basis for the electrical system. By coordination of this apparatus, a fault at any one point in the system can be localized and repaired while the rest of the system carries the load. It's electrical system team play that results in maximum protection.

For example, this simple spot-network system provides excellent service continuity and voltage regulation. *In the event of a transformer or primary feeder fault, the other primary feeder and transformer automatically take over the load.*

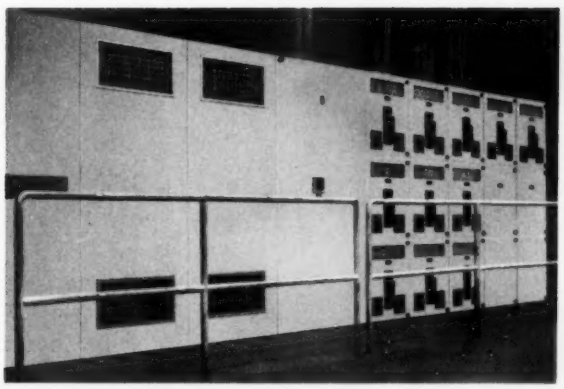
Network protectors are the heart of this automatic operation. They connect the transformer and primary feeder to the power center load bus. The protector avoids system shutdown by automatically interrupting power from a faulted transformer or feeder line and transferring the load to the unfaulted transformer at the power center. Thus service



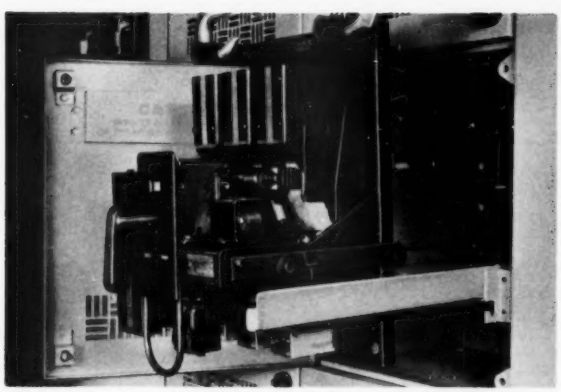
continuity is maintained without the cost of connecting power center load buses together with a loop circuit.

Specific savings result. In addition to providing excellent service dependability, the simple spot network adds the benefits of bringing high voltage right up to the load-area power center. Long, heavy secondary lines are cut down. You save substantially in copper. Power losses from over-extended secondary lines are eliminated and voltage regulation greatly improved.

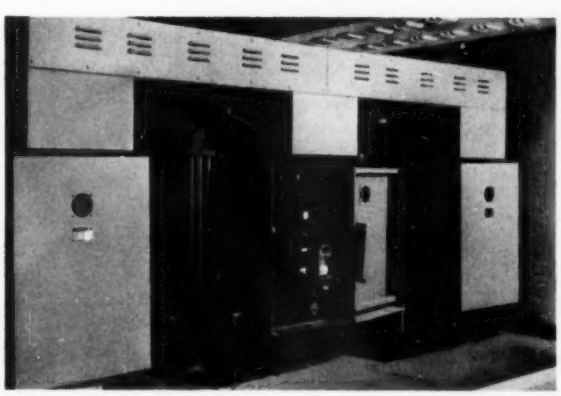
Network protectors connect transformers in parallel to the power center load bus. In the event of a fault, the protector isolates the faulted transformer and transfers the load bus to the other transformer and feeder to maintain service.



Balcony-mounted power center conserves plant floor area for production. No vaults or enclosures are needed for Westinghouse Dry-type Power Centers, cutting installation costs about 25%. Hipersil® transformer core reduces weight as much as one-third.



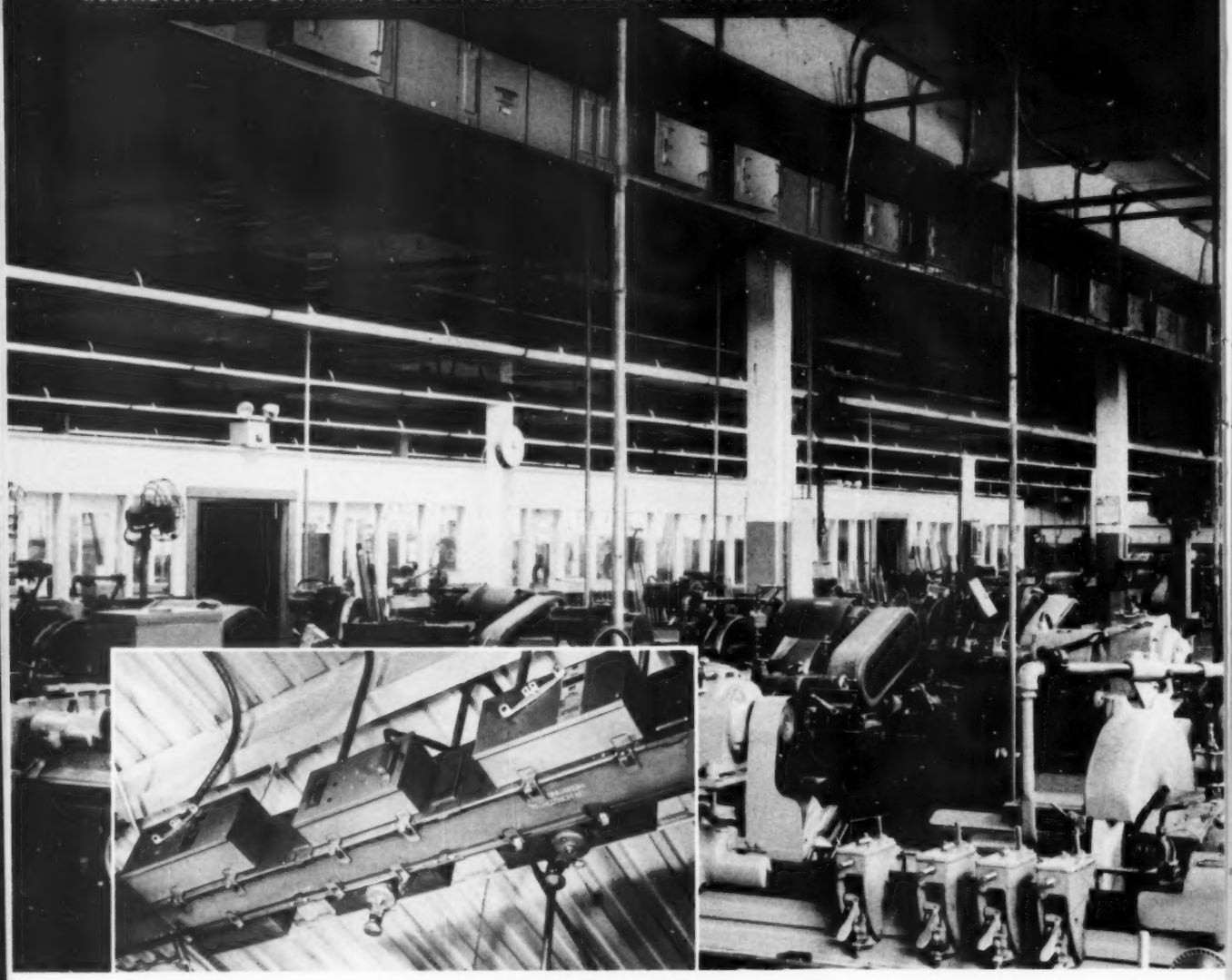
More protection in less space. Low-voltage DB breakers contain a multi-purpose tripping device to prevent false shutdowns. It provides: (1) delayed tripping on temporary overloads; (2) trips on larger overloads before damage is done; and (3) trips instantly on short circuits.



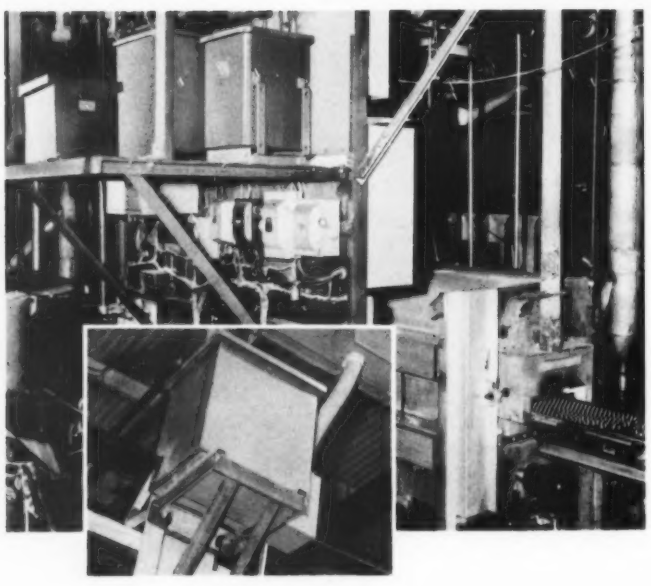
Westinghouse

Here's reliability in getting power to the load more efficiently . . .

RELIABILITY IN GETTING POWER TO THE LOAD MORE EFFICIENTLY



With bus duct, down time per operator was cut to 5 minutes in a Massachusetts tool company plant when 139 machines were relocated. Flexibility of plug-in devices made this possible. Insulated plug-in openings allow workers to install take-off devices quickly and with complete safety.



"With Westinghouse Dry-type Transformers we don't worry about costly shutdowns," reported the maintenance engineer of an eastern company. "On-the-spot power is available for our heat-treating department." Platform or column mounting saves floor space and long, costly secondary runs.

YOU CAN BE **SURE**...IF IT'S

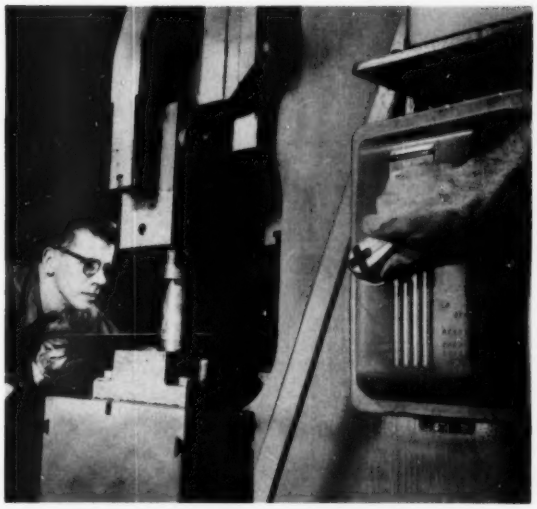
Here's how these plants limit down time

Three-shift electrical protection is critical today—critical in sustaining full production, critical when maintenance men may not be available to correct an unpredictable outage. Down time and maintenance costs can cut back plant profit seriously. Here's how Westinghouse products can help:

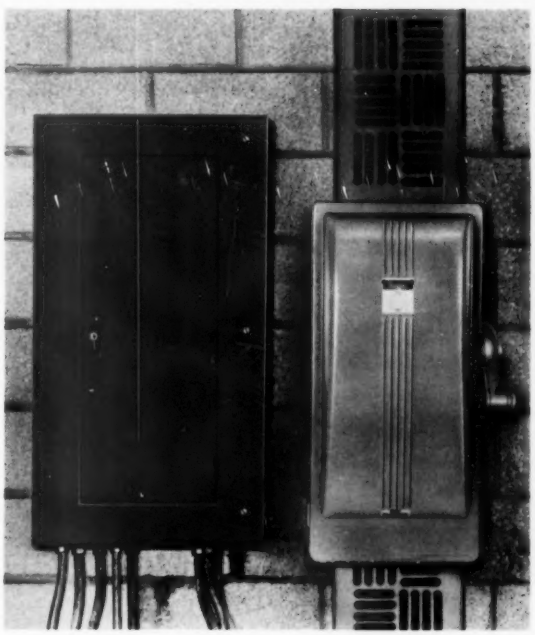
Westinghouse Plug-in Bus Duct, for example, speeds production-line change-overs. It permits quick addition of new circuits, easy transfer of old ones. Prefabricated in sections, bus duct goes up faster than cable and conduit. Savings in installation frequently reduce the original cost below that of any other secondary power distribution equipment. In addition it is readily salvageable, dismantled, reassembled and expanded.

AB-I circuit breakers minimize shutdown time three ways: first, they will not interrupt power on temporary, harmless overloads. Second, when the line is cleared after a heavy overload, power is restored simply by a flip of the handle. There is nothing to replace, no running after fuses. Third, there is no danger of over-fusing or under-fusing. AB-I circuit breakers preserve precise calibration throughout the life of the installation.

Westinghouse Dry-type Transformers virtually eliminate maintenance problems ordinarily connected with transformers. There are no liquids to store, recondition or replace; no valves, no gaskets or gauges to get out of order.



AB-I circuit breakers cut down time, saved over $1000 a year for a Massachusetts company. Previous power failures on induction heating equipment ran to $1000 and $1500 yearly. Now, AB-I circuit breakers prevent loss of material in process and lost-time pay.

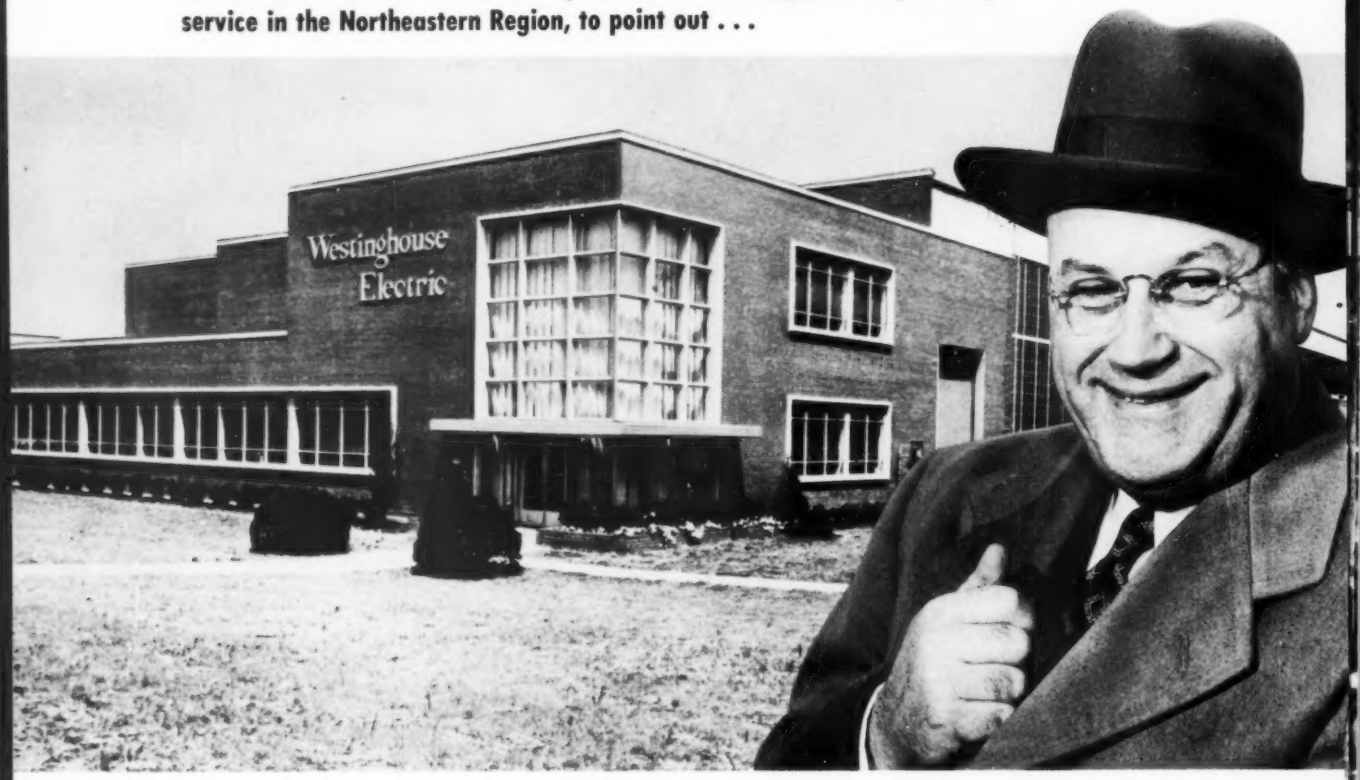


Safety switch and panelboard combination improved flexibility for this Midwestern company. Westinghouse Add-A-Cirkit Panelboards save space, provide room for expansion.

Westinghouse

Next page, how you benefit from Westinghouse field service in depth . . .

Here is M. L. "Matt" Gardner, responsible for Westinghouse engineering service in the Northeastern Region, to point out . . .



Your power problems are local . . . so is Westinghouse field engineering

The many Westinghouse engineering service people, like myself, are your link with a network of Westinghouse services. One phone call to us adds a complete engineering service team to your staff.

Consulting and application engineers can speed equipment installation time, eliminate problems right from the start. They work with your staff, help match the correct product to the job. They not only install Westinghouse Equipment, but test it to assure proper operation.

Manufacturing and Repair Service Plants—There are 38 of them strategically located in major industrial centers. Engineering and service are always available to repair your equipment right in your own plant, too.

Backup, spare parts inventory—Westinghouse Renewal Parts Warehouses are located in 31 industrial centers. They're open 24 hours a day. You can get replacement parts fast, and where you need them.

* * * * * *

For further details your Westinghouse Representative will be glad to answer any questions you may have concerning information in this section and get you a copy of the literature listed below, or write to Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pa.

ASK FOR

- ☐ Gas Turbine Power Plants **B-5887**
- ☐ High-Voltage, Metal-Clad Switchgear **B-5306**
- ☐ Low-Voltage, Metal-Enclosed Switchgear **B-5282**
- ☐ Dry-type Transformers **B-5920**
- ☐ Bus Duct **B-5835**
- ☐ AB-I Circuit Breakers **B-5456**
- ☐ Safety Switches **B-5457**
- ☐ Panelboard Planning **B-5260A**
- ☐ Control Centers **B-3621**
- ☐ Capacitors **B-3966A**
- ☐ Current-Limiting Reactors **B-5918**
- ☐ Preventive Maintenance Booklet **B-5477**

. . . and ask for a showing of the 20-minute film "Selecting the Right Industrial Distribution System."

YOU CAN BE SURE...IF IT'S Westinghouse

MP-3013

Handclasp of a friend-in-need

There's confidence in the very "feel" of the world famous C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguishers. The quick-acting "Squeez-Grip" fits your hand naturally like a handclasp... hangs right... carries right... works right. You're in complete command of the situation instantly... no fumbling... no fatigue.

From the non-conducting, shatterproof discharge horn to the high strength, durably finished cylinder, you get top quality construction that results in a lifetime of satisfactory service. Because of the very few working parts and corrosion resistant materials throughout, the total cost to you over the years is less than other initially lower priced makes... fire after fire, recharge after recharge, without trouble.

It's not hard to see, when you fully compare and try, why C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguishers are your best buy for killing flammable liquid and electrical fires, as well as some surface fires involving ordinary combustible materials. Sizes range all the way from 2½ to 100 pounds capacity... all fully approved by the Underwriters' Laboratories, Inc., Factory Mutual Laboratories, Armed Forces and Government Bureaus.

With C-O-TWO Squeez-Grip Carbon Dioxide Type Fire Extinguishers the penetrating carbon dioxide is a clean, dry, non-damaging, non-conducting, inert gas... smothers fire instantly, leaves no after fire mess... harmless to equipment, materials and finishes... even food is still perfectly edible.

Act now for complete free information on these first-rate, sure-acting fire extinguishers. Remember fire doesn't wait ... get the facts today!

C-O-TWO

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers
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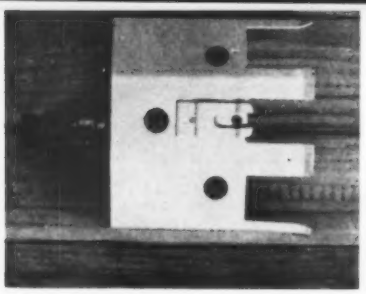


Fig. 1. From this starting fixture, a line of fixtures can be plugged in to it

Installation is Easy With Plug-In Fluorescents

This fluorescent fixture enables a plant to add to its lighting needs in a matter of minutes . . . The steps required to install this lighting equipment are mentioned below

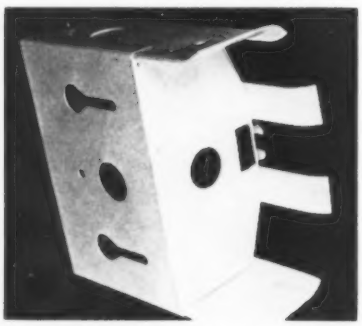


Fig. 2. Key hole slots slip over head of screw, hold fixture securely to ceiling

Fig. 3. Installation is possible from the floor with special extension tools

FLUORESCENT FIXTURES that plug in like an electric drill offer industry a simple, quick method of installing such equipment to take care of a plant's lighting needs.

The first step in installing these fixtures is to connect the short, starting fixture to an electrical circuit. See Fig. 1. Following this, the necessary screws are inserted in the ceiling to support the fixtures.

All that is needed after this is to slip the key hole slots of the fluorescent fixtures, Fig. 2, over the heads of the screws and plug the fluorescent fixtures into the starting fixture. The manufacturer says it is possible to extend this to 100 ft of continuous light from the one 15 amp starting fixture.

Because of the ease of installation, two men can handle the installation for an average ceiling by walking along the floor and with special extension tools make the necessary connections for the fixtures. This is illustrated in Fig. 3.

Much the same technique of slipping the key hole slots of the fixtures over the screw heads is used with fixtures fastened to floor boards or rafters. The maker of this Plug-in-Line fixture states that a simple arrangement is provided for suspending the fixtures in a plant where there are high ceilings or an open area.

An electrician may be employed to install the starting fixture and making the necessary connections to the electric light circuit. The connections to the starting fixture can be BX, conduit or any other approved wiring. After electrical connection has been made, the manufacturer points out that the installation is entirely mechanical and not electrical and, therefore, can be handled by someone other than an electrician.

Maintenance of these fixtures is at a minimum. If one chooses to remove the tubes to clean the fixture, there is no exposed starting unit that might cause shock if wiped with a wet cloth. The ease of removing the fixtures also simplifies the job of painting or spraying the entire ceiling.

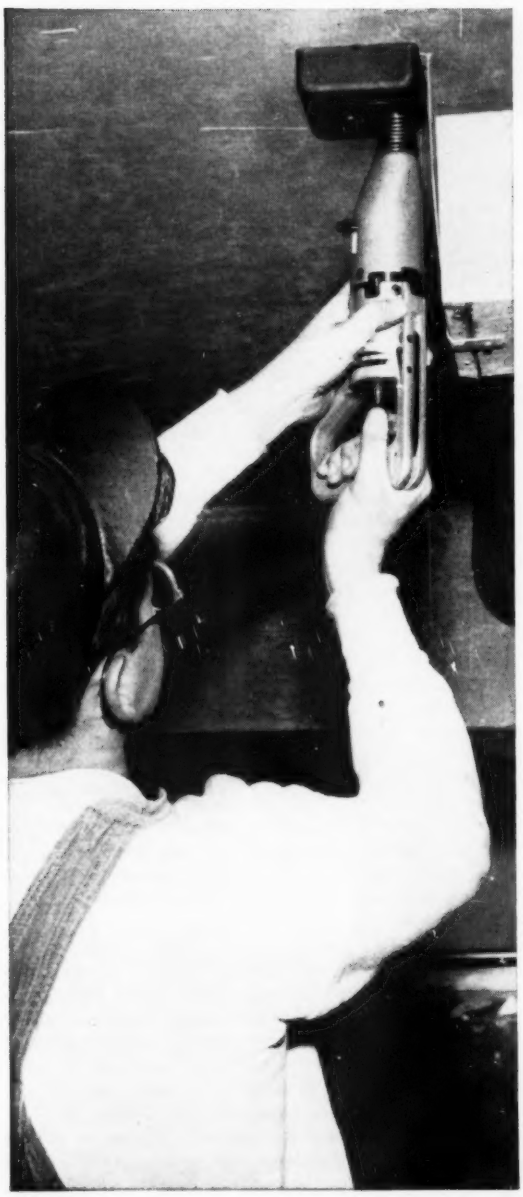
Additional Information

If you would like to receive more information about this product, either write the Editor, Plant Engineering, 110 South Dearborn St., Chicago 3, Illinois, or indicate "Plug-in-Line" on bottom of postage-paid card in issue.

Fig. 4. Fixtures are raised to ceiling, slipped over mounting screws (arrows) and then plugged into starting fixture

Fig. 5. View of an industrial installation. The complete fixture can be easily removed for maintenance, if necessary

Anchor Ducts to Concrete and Cut Your Costs Up to 80% with the REMINGTON STUD DRIVER



"Paid for itself in just two jobs." Reports like this keep coming in from sheetmetal men about the Remington Stud Driver. They're setting up to 5 studs a minute in concrete and steel with this amazing powder-actuated tool. Savings run as high as 80%, compared to conventional fastening methods!

Economy like this gives the contractor a definite advantage. He can bid lower, be more competitive. And he can tackle almost any fastening job. Completely self-powered, the Stud Driver requires no outside source of power—no troublesome wires or cables. Its light weight and compact size bring every job within easy reach.

It will pay you to get all the facts about the Remington Stud Driver. It's been test-proved to be the world's speediest fastening system and can help you get the job—do the job—faster and easier than ever before. Just send in the coupon for complete information.

QUESTIONS YOU ARE ASKING

QUESTION:

What are the studs made of?

ANSWER:

Genuine Remington studs are made of a selected molybdenum-bearing alloy steel, heat-treated for required hardness and ductility properties. All are plated for protection against corrosion.

"If It's Remington—It's Right!"

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Please send me *free* copies of the new booklets showing how I can cut my fastening costs.

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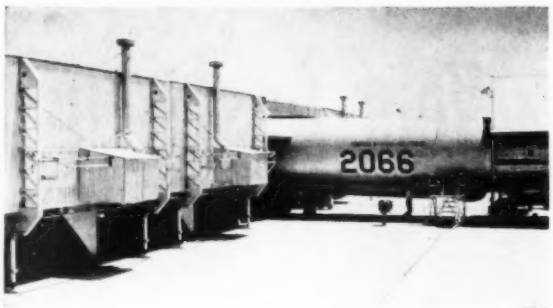
For more facts circle 566 on Reply Card

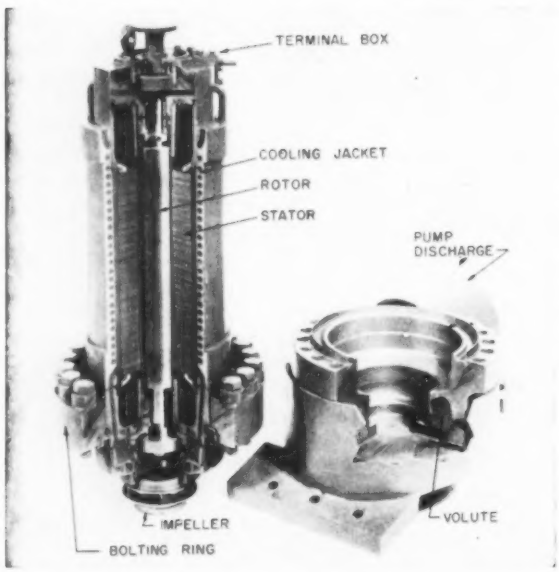
Unit Heaters Make "Wrap-Around" Wing Shelters Comfortable for Winter Work

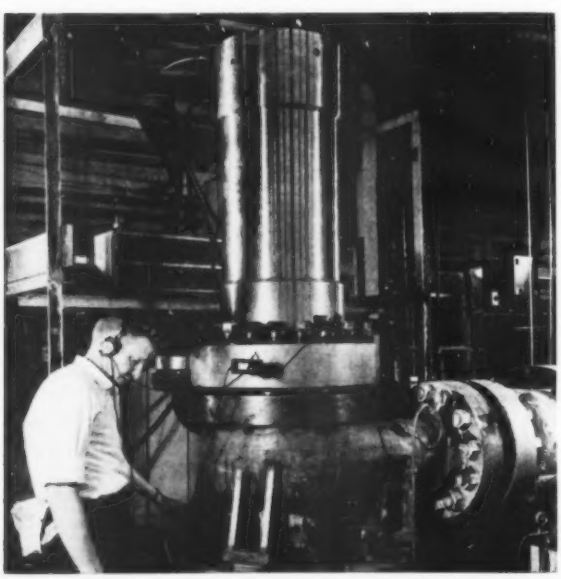
PLANT ENGINEERS AT CONVAIR'S Fort Worth, Texas, heavy bomber plant have developed a method of servicing planes in all kinds of adverse weather, that still retains comfortable working conditions for repair and maintenance men. Convair uses corrugated aluminum service docks with gas-fired Janitrol blower-type unit heaters to provide wintertime comfort for employees.

Designed primarily for working on the ten engines of the world's largest bomber, the B-36, the mobile service docks provide convenient electrical and compressed air outlets. They are enclosed on three sides, top and bottom with corrugated aluminum, and the remaining side is covered with a canvas flap.



Nuclear Power for Submarine Fosters Development of "Canned" Pump





A SERIES OF HERMETICALLY SEALED centrifugal type motor pumps have been developed for operation with water at approximately 500 F and at a pressure level of 2000 psi. Conventional type shaft seals have been eliminated by enclosing the entire motor and pump assembly into one hermetically sealed housing.

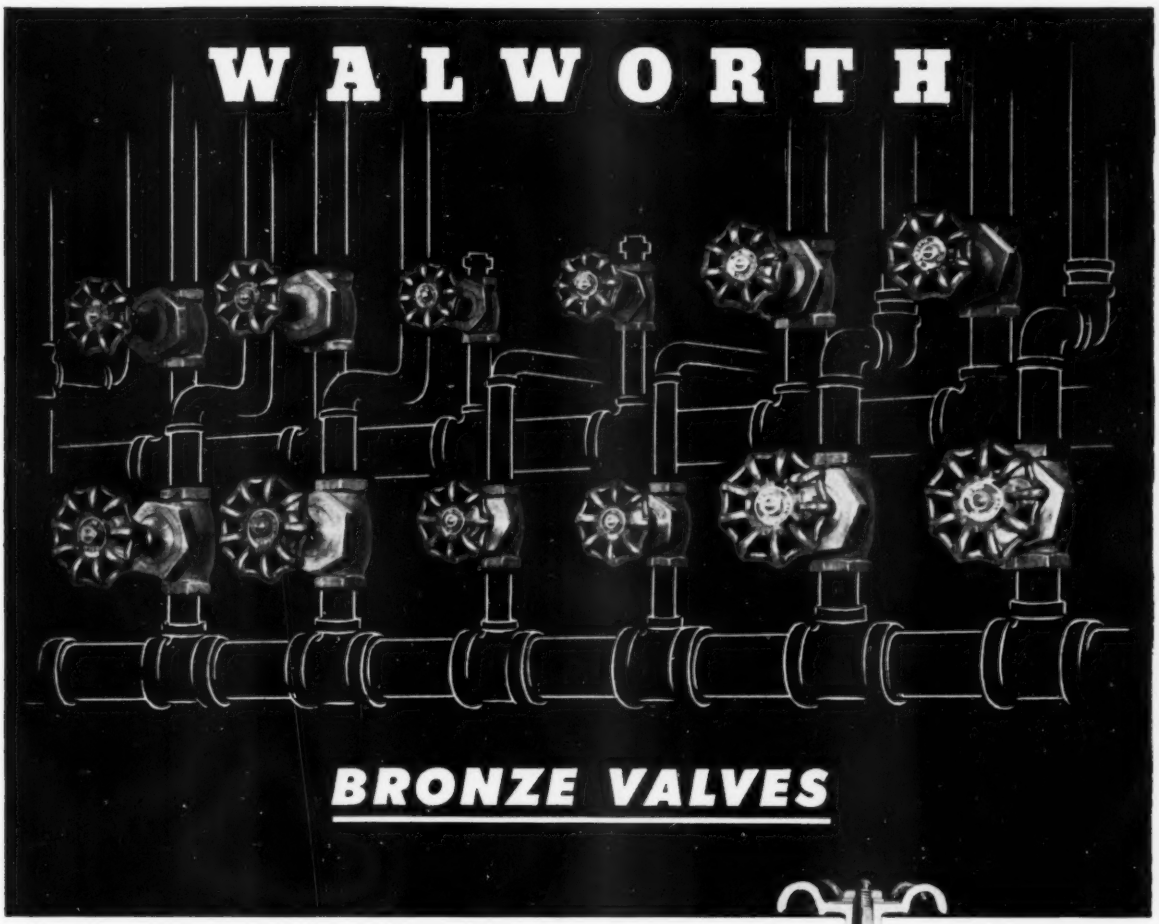
The system in which such pumps are used consists of a closed hydraulic circuit containing a nuclear reactor, where heat is generated by atomic fission and transferred to the pumped fluid, a heat exchanger where the heat is removed from the primary fluid and transferred to a secondary fluid, usually water, and "canned motor pumps" which complete the cycle by returning the fluid to the reactor. The need for the pump to be leak tight arises from the condition of the primary cooling fluid which, in passing through the reactor, may become dangerously radioactive.

Elimination of the seal on a canned pump is accomplished by encasing the pump and its electric drive motor within a single pressure-tight housing, usually made in two parts, and then bolted and seal welded together at assembly. When this is done, the fluid being pumped has access to the motor bearings, and conventional oil lubrication cannot be employed. Lubrication is supplied by the pumped fluid; and it becomes necessary to provide, for the bearing and the journal, materials which have good bearing properties, are compatible with one another, are non-galling, and are corrosion resistant in the primary fluid. In order to protect the windings from attack by the hot fluid, it is necessary to line the stator bore with a thin cylinder or "can" of sheet metal, welded leak tight in place. It is customary also to can the rotor, also for corrosion reasons. It is from these cans that the term "canned motor pump" is derived.

The successful development of canned motor pumps for main coolant service resulted from work done by three industrial concerns, the Westinghouse Electric Corp., the Byron Jackson Pump Co. and the Allis-Chalmers Manufacturing Co.

The Westinghouse pump is a vertical, single stage, centrifugal unit operated at 3540 rpm by a 300 hp, integral electric induction motor utilizing silicone Class H insulation. The pump volute is of the single suction, double volute type and is a permanent part of the loop piping system. Over-all pump and volute length is 76-$\frac{11}{16}$ in., and the pump barrel diameter is 20 in. The pump and bolting ring weigh 4300 lb, and the volute another 2300 lb, making a total of 6600 lb for the complete unit. The seven blade, Francis type impeller is made of cast stainless steel and is the only casting used in the pump.

WALWORTH

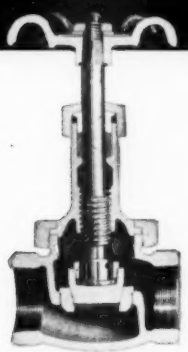


BRONZE VALVES

Better because ... **Walworth has standardized its line of bronze valves to provide an unsurpassed system of interchangeability of parts for assembly or replacement. You can maintain a great number of Walworth Bronze Valves with a small inventory of basic parts . . . you minimize part replacement problems. For further information, ask us for our Bronze Valve Standardization Chart.**

Choose from complete lines of Walworth Bronze Valves – including gate, globe, angle, check, and lubricated plug types. Walseal® Bronze Valves and Fittings are also available for making silver-brazed joints.

For full information on Walworth Bronze Valves and Fittings, call your Walworth Distributor, nearest Walworth Sales Office, or write to Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.



Parts are carefully machined and finished to close tolerances, thereby assuring accurate fit and alignment under all conditions. Sectioned valve is Walworth No. 225P Bronze Globe Valve with stainless steel plug-type seat and disc, heat-treated to a minimum of 500 Brinell hardness.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

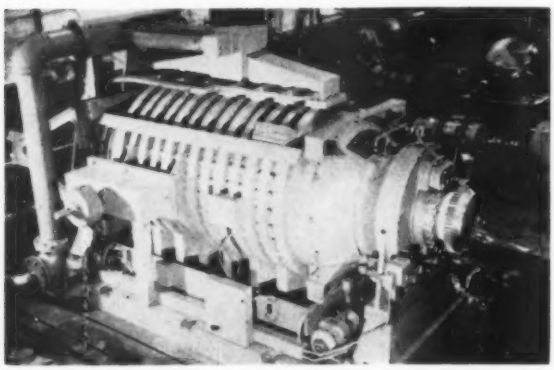
60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

For more facts circle 567 on Reply Card

Massive High Speed Dynamometers Provide 20,000-hp Test Facilities

RECENTLY SHIPPED by the Eaton Mfg. Co., Kenosha, Wis., a 10,000-hp high-speed eddy current absorbing dynamometer will be used with another such unit to provide test facilities to 20,000 hp. The units will have a speed at this horsepower of 600 to 5800 rpm.



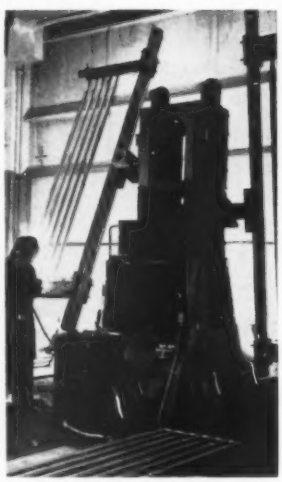
To facilitate runs to 15,000 rpm, a gear reducer is located between the unit under test and the dynamometers. The three units—gear reducer and two dynamometers—are mounted in trunnion bearings so that the developed torque can be read on acutely accurate weighing instruments. From torque and speed, horsepower may be determined.

Features of the dynamometer include: 1) total torque of the two dynamometers at 600 rpm is 175,000 lb-ft; 2) total torque at 5800 rpm is 18,000 lb-ft; 3) water required to cool both units when absorbing 20,000 hp will be 2000 gpm; 4) the rotor and shaft consist of one homogeneous piece of forged steel; 5) the active part of the rotor is 36 in. in diameter, 80 in. long, and weighs 26,000 lb; 6) bearings are of the sleeve type, 11 in. in diameter, 11 in. long; 7) Bearing pressure is 260 psi; 8) total weight of the two dynamometers and the gear reducer is about 220,000 lb.

Windmill Makes Welding Easier

WELDING POSITIONERS, that look like windmills, are dual mounted for space economy at the General Electric Company's new medium transformer plant at Rome, Ga.

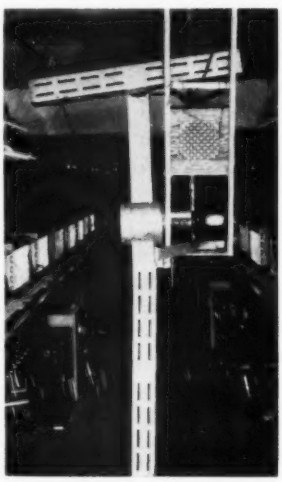
In one application, the positioners are adjusted to handle banks of external cooling tubes for transformers. Headers can be turned end over end as the welding progresses, to provide "downhand" welding to secure the transformer cooling tubes to the header. Downhand welding relieves operator fatigue and greatly improves welds.



Shop-Built Sampler Tests Air

TEST ROOM TEMPERATURE and humidity at Gibson Refrigerator Co., window air conditioner maker, are closely controlled. A Kathabar unit, made by Surface Combustion Corp., handles the job, acting on temperature-humidity analysis of air samples that are withdrawn from various levels in the test room.

To equalize sample, Gibson built T-shaped sampler. Fan pulls air past wet and dry bulb thermometers. Control is maintained ±1 deg F near sampler, and ±2 deg F in area 6 to 12 ft from it.



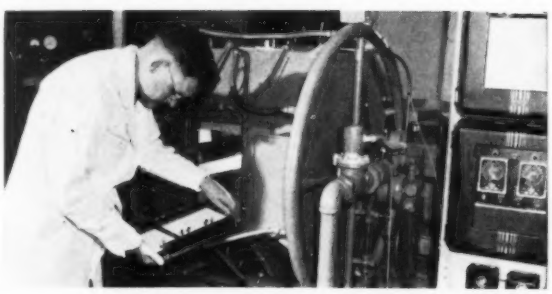
Research Testing Unit Features Artificial Sun and Dew for Paint Tests

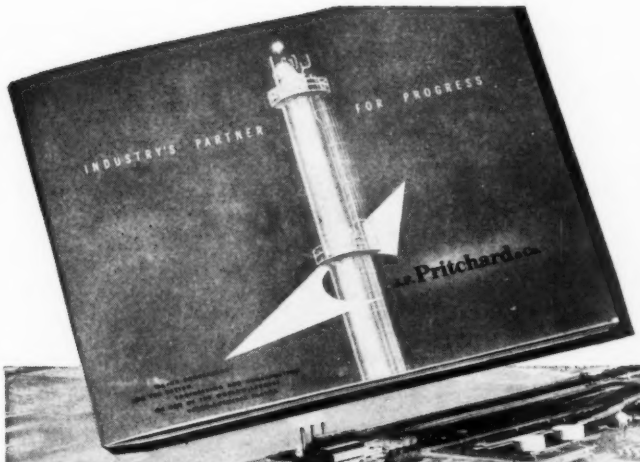
GENERAL MOTORS RESEARCHERS have built a "Little Florida" that weathers paint 20 times faster than nature and promises to give new ideas for keeping car finishes shiny longer.

The apparatus wears the gloss off car paint in a week or two—a process that ordinarily takes from six months to a year, even in severe weather.

Outdoor tests at GM's test fields have labeled sunlight and dew the worst enemies of paint finish. The test unit was therefore designed with both these factors in mind, and the unit has both an artificial sun and dew supply. The sun is a 1200-watt high pressure mercury arc lamp, and the dew is water vapor condensed when cold water passes through a metal box on which test panels are clamped.

Resembling a lottery drum, the entire unit is about five feet in length. Paint test panels are fastened on the inside wall of the drum where they rotate around the "sun."





Like to have a picture story of this petro-chemical plant?

Write for this booklet today!

Here's a brochure that's almost as good as a guided tour through the Tuscola, Illinois plant of National Petro-Chemicals Corporation. It's a picture story, in brochure form, of the design, construction and engineering of one of the world's largest petro-chemical plants.

Twenty-four pages of photographs let you see for yourself the complexity of this $50,000,000 installation, for which J. F. Pritchard & Co. was the major contractor.

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Please send me my complimentary copy of your brochure describing the National Petro-Chemicals Corporation's Tuscola, Ill. plant.

Name _____

Position _____

Firm _____

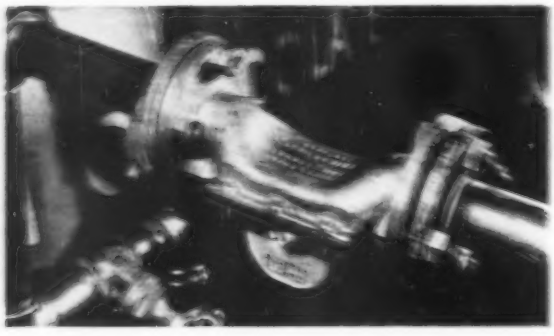
Address _____

City _____ Zone ____ State _____

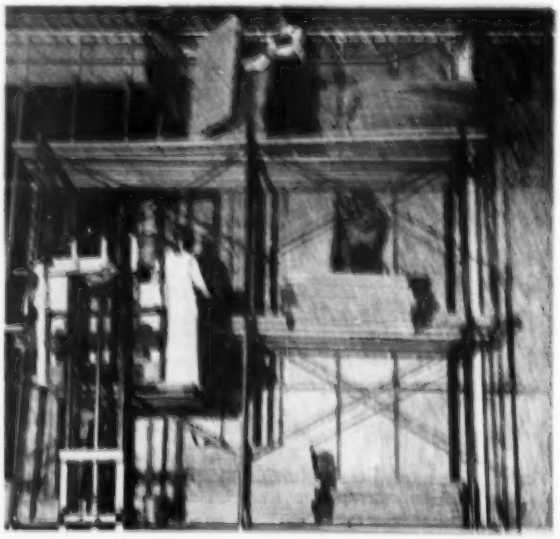
For more facts circle 568 on Reply Card

Huge Aluminum Ingots Get Ultrasonic Check for Flaws Before Forging

Chocolate Gets Final Purity Check Through Magnetic Pipeline Trap

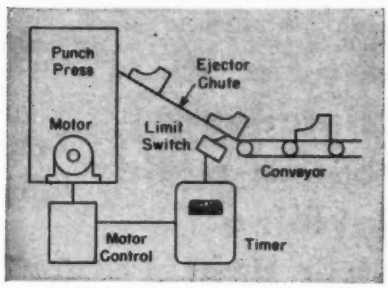


Cold Storage Warehouse for Frozen Concentrates "Wrapped in Glass"



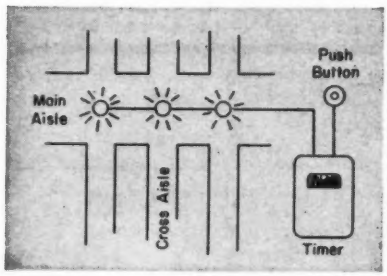
ELECTRONIC DEVICES—YOUR FIRST STEP TOWARD AUTOMATION

G-E Electronic Timers Protect Machines and Speed Production



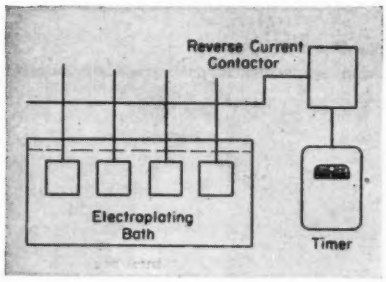
Automatic Machine Protection

Here, a G-E Electronic Timer helps protect punch press dies against damage which might occur if a piece were not ejected. Each time a piece is ejected it passes over a limit switch which activates the timer. If pieces continue to pass over the limit switch at the proper rate, the press will continue to operate. Should a piece fail to be ejected, the timer will "time out," automatically shutting down the press.



Safer, Faster Warehouse Flow

Here, in a busy warehouse, the main and cross aisles carry many fork trucks. Red lights at all intersections warn cross traffic when other trucks are approaching. As a truck operator starts down a main aisle he pushes a button turning on the lights and starting the timer. After time set on timer dial elapses, lights turn off and cross traffic resumes. This system has speeded flow and reduced accidents.



Accurate Reverse Plating Time

Here, a G-E Electronic Timer provides accurate time control for reverse electroplating. Reverse plating improves plate surface and reduces polishing necessary for the finished piece. It should, however, be accurately and automatically timed for best results. This G-E timer is giving excellent, 24-hour-a-day service because of its high quality components and heavy-duty contacts which are good for at least a million operations at full load.

PERFORMANCE FEATURES

Excellent Repetitive Accuracy
High-quality capacitors hold accuracies within ± 2% of dial setting, independent of normal temperature changes.

Three Time Ranges Available
.06—1.2, .6—12, 6—120 seconds, each continuously adjustable through a 20:1 range.

Two Types of Operation
Can be connected for immediate or delayed start.

High Contact Rating—10 Amps
Long life, more reliability—one million operations at full load . . . up to 10 million at less load. Handles motor starters to NEMA Size 3, starts f-hp motors directly.

Remote Control
Timing potentiometer and dial assembly may be located where most convenient.

Construction
High quality components, conservatively rated for top performance and long life.

PHOTOELECTRIC RELAY CR7505-K100

One of a complete line of devices for all photoelectric applications. Inexpensive, has broad application. Bulletin GEA-3533D.

ELECTRONIC RELAY CR7511-A126G2

Sensitive to circuit resistance changes, this versatile relay is used for controlling liquid levels, sorting, etc. Bulletin GEA-5893.

FOR MORE INFORMATION, contact your nearest G-E Apparatus Sales Office or authorized G-E distributor, or write General Electric Company, Section E790-3, Schenectady 5, New York, for the following bulletins:

- GEA-5255B, Electronic Timer
- GEA-3533D, Photoelectric Relay
- GEA-5893, Electronic Resistance-sensitive Relay

Name..... Title.....

Company.....

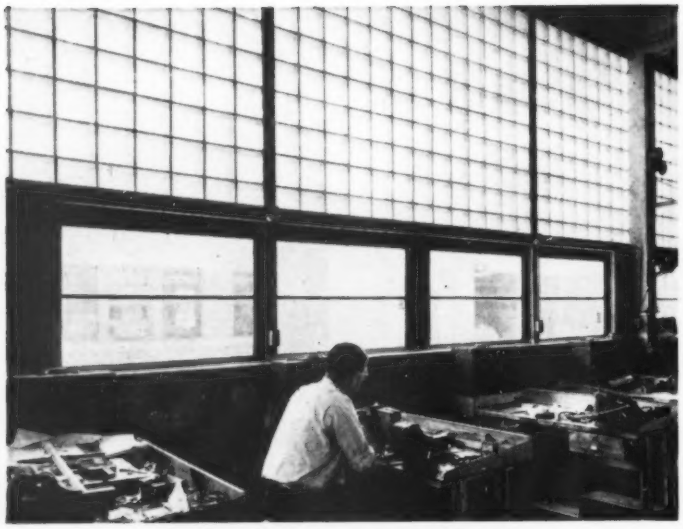
Address.....

City..... State.....

ELECTRONIC DEVICES

GENERAL ELECTRIC

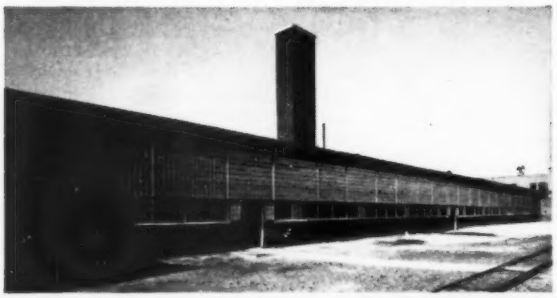
For more facts circle 569 on Reply Card



Haughton Elevator Company, Toledo, Ohio
Bellman, Gillett and Richards, Architects
J. H. Berkebile & Sons, Contractors

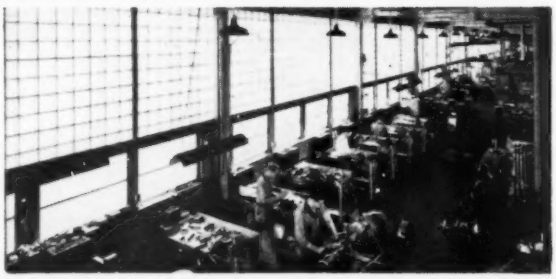
How OWENS-ILLINOIS GLASS BLOCK* solved a maintenance problem while providing better light

BEFORE GLASS BLOCK
the building was daylighted by single-glazed, wood sash, presenting both costly maintenance and daylighting problems.



AFTER GLASS BLOCK
maintenance costs tumbled. Glass block can't rust, rot or corrode . . . are hard to break.

BEFORE GLASS BLOCK
the wooden sash with clear glass offered no daylighting control, glare was a problem.



AFTER GLASS BLOCK
eye-straining glare is eliminated. Light-Directing Glass Block plus vision strip keep brightness at comfortable levels, provide vision and ventilation.

The Haughton Elevator Company is typical of many buildings now faced with two problems: 1) What to do about worn-out window sash and 2) how to control and make better use of free daylight. How Owens-Illinois Glass Block solve both problems is told in the pictures and captions.

When workers must operate to extremely close tolerance, Owens-Illinois Light-Directing Glass Block provide an extremely effective daylighting system. Daylight is directed upward and diffused over all parts of the room all day long. It's almost as if your building "turned with the sun."

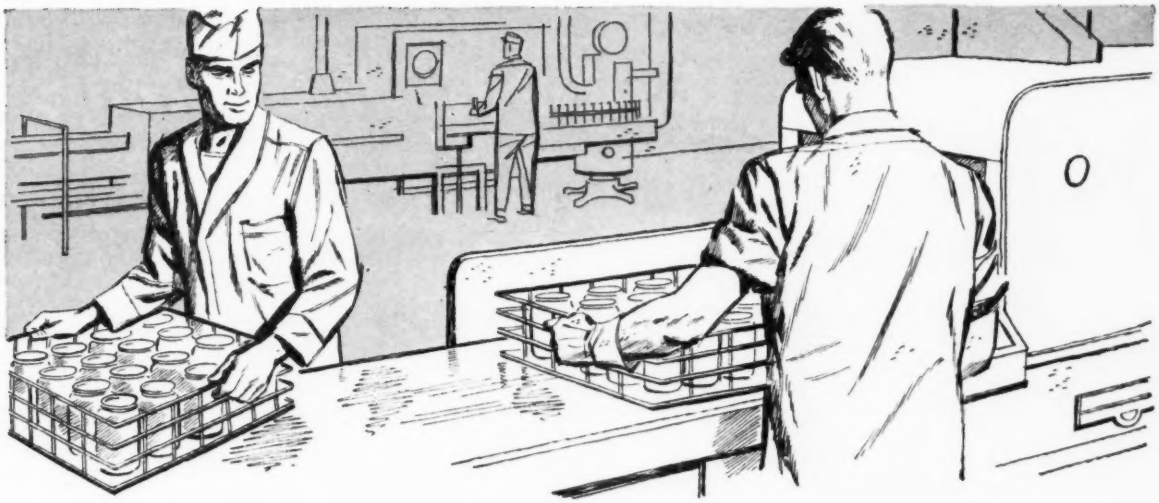
For more information how sash replacement with Owens-Illinois Glass Block can cut your maintenance costs and provide better light while doing it, write Kimble Glass Company, subsidiary of Owens-Illinois, Dept. PE-8, Toledo 1, Ohio.

Formerly known as INSULUX

OWENS-ILLINOIS GLASS BLOCK
AN (I) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES · TOLEDO 1, OHIO

For more facts circle 658 on Reply Card



New Two-Temperature Water Heater provides perfect sanitation in plant cafeterias

Let us show you how Sanimaster's ONE tank simultaneously provides 180° water at the proper flow-rate for dishwasher, 140° for pot sinks!

Yes, the Ruud-Monel Sanimaster—a self-contained storage water heater without coils—gives *unrestricted* flow of 180° water for the sanitizing rinse.

Sanimaster automatically supplies the right temperature hot water wherever it is needed. That means *sanitizing* hot water at the dishwasher; *regular* hot water at the pot sinks and other faucets. For all other building requirements, too.

And it supplies *both* these needed temperatures from the *same tank* at the *same time!*

RUST-PROOF MONEL . . . the *high nickel, lifetime* metal . . . safely holds water at 180°! Will not rust, ever. Ruud-Monel Sanimaster, with its exclusive, long-life Monel tank, provides sparkling clear hot water for years and years.

Other plant uses where Sanimaster is ideal:

- **Lavatories**
- **Showers**
- **Wash fountains**
- **First aid room**
- **Laundering**
- **Special processing**
- **Truck & car washing**
- **Sanitizing**

180° SANITIZING HOT WATER is piped directly into the dishwasher. This extra-hot water destroys bacteria . . . speeds air-drying of dishes, eliminating costly hand-toweling.

140° GENERAL-USE HOT WATER is always on tap at the faucets. For sinks, lavatories, showers—anywhere regular temperature hot water is needed.

FREE DISHWASHER CHARTS! We will gladly send you our free Dishwashing Charts showing the correct Ruud-Monel model for every dishwasher make and size.

Mail this Coupon Today!

RUUD-MONEL
two temp
SANIMASTER

RUUD MANUFACTURING COMPANY
Dept. B-12, 2934 Smallman Street, Pittsburgh 1, Pa.

☐ Send me the FREE Dishwasher Charts and Literature.
☐ Please have a Ruud water heater specialist call on me.

Name_____ Title_____

Firm Name_____

Street_____ City_____ State_____

For more facts circle 570 on Reply Card

Modernize Distribution Systems

with SORGEL Air-Cooled Transformers

Increase feeder capacity by transmitting electric power to load centers at higher voltages

The Most Practical Type Transformers to Reduce Voltage at Load Centers

Air-cooled dry-type transformers are the most practical type for indoor installations, and it is important that the transformers are of the best quality—SORGEL transformers. They require little or no maintenance; no liquid to check or replenish; no fire hazard; small and compact; economical; easy and convenient to install; no vault required.

Increased Efficiency

Sorgel air-cooled dry-type transformers are so quiet in operation that they can be installed in almost any convenient place inside of buildings, close to the load center. This results in shorter feeders, better voltage regulation, more efficient distribution, and lower wiring cost.

Easy and Low Cost Installation

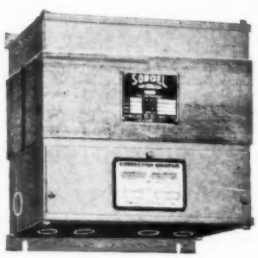
All self-contained in a single unit. Easy to install. No separate mounting brackets or junction boxes to make or buy. Substantial wall brackets, with slots for bolts, or floor mounting base, are an integral part of Sorgel transformers. Roomy connection compartment with wide choice of knockouts. All transformers are equipped with solderless terminal lugs and permanent connection diagram.

Liberal Design for Full Rated Load

Sorgel transformers are guaranteed to carry the full rated load continuously. They are so liberally designed that they can safely carry a temporary overload.

Large Variety for Every Purpose

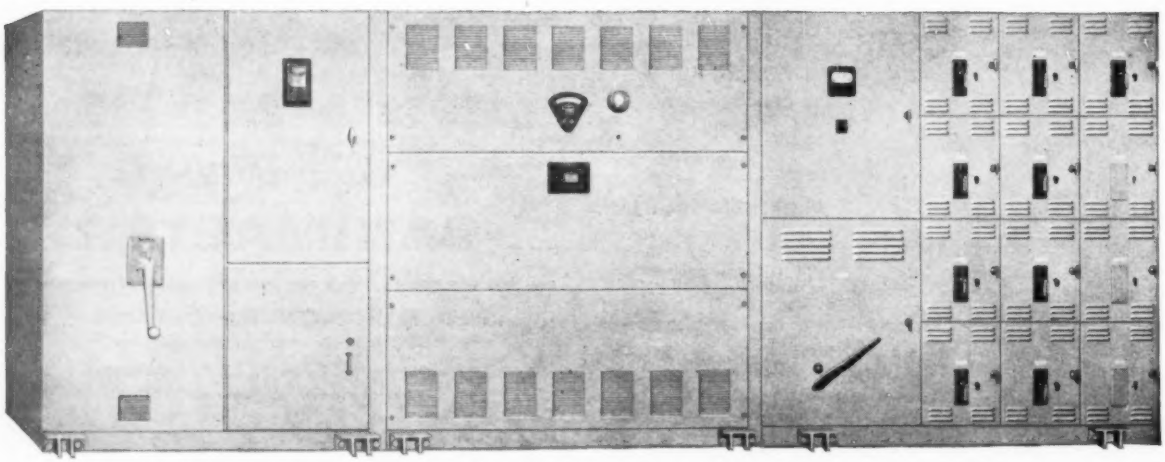
These transformers are available in a large variety of sizes and types for every purpose. ¼ Kva to 1000 Kva single phase. 1 Kva to 3000 Kva 3-phase. All standard voltages, such as 120, 208, 240, 480, 600, 2400, 4160, 4800, 7200, 13,200, and up to 15,000 volts, and any intermediate or special lower voltages.



1 to 10 Kva 3-phase

A Perfect Partner for Substations

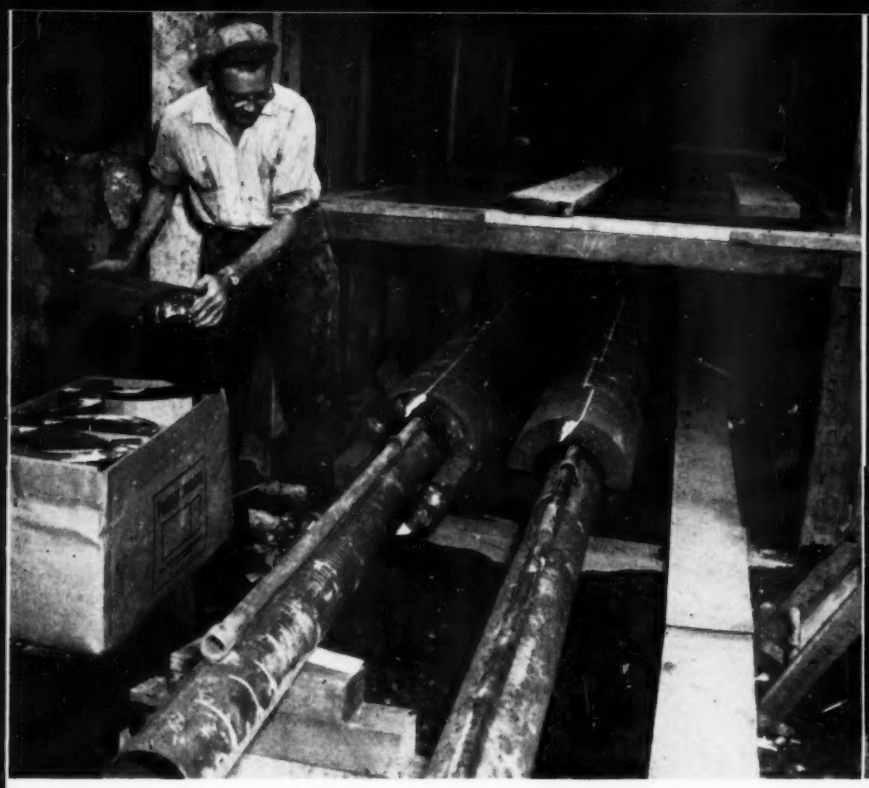
Sorgel transformers can also be incorporated in substations, complete with primary and secondary switchgear. They are procurable with any make of switchgear, and from any substation manufacturer.

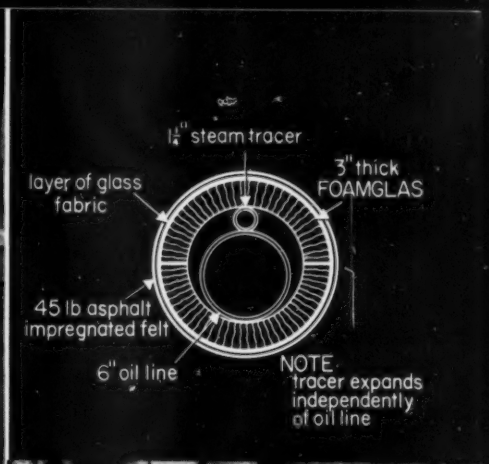


Unit substation, with primary switchgear—metering—2000 Kva 3-phase, 13,200 volt transformer—secondary circuit protection. Shipped completely assembled, wired and tested, ready to connect to lines. Nothing else to buy, make, or assemble.

SORGEL ELECTRIC CO., 844 West National Ave., Milwaukee 4, Wis.

For more facts circle 571 on Reply Card




1¼" steam tracer
3" thick FOAMGLAS
layer of glass fabric
45 lb asphalt impregnated felt
6" oil line
NOTE tracer expands independently of oil line

Con Edison engineers report:

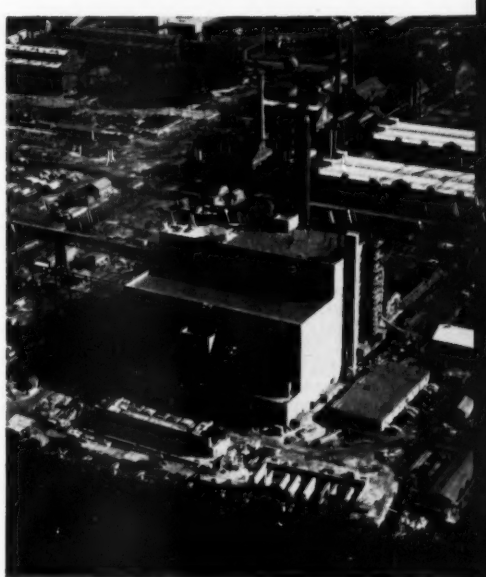
"We chose FOAMGLAS for underground pipe insulation because it stays dry!"

Consolidated Edison Company's engineers are using waterproof FOAMGLAS to insulate underground heated fuel oil lines at their Astoria, N.Y., Generating Plant. They report: "In this underground installation, our first concern was to get an insulation which would resist moisture and give consistent insulating results under damp conditions. We chose FOAMGLAS because of its moisture resistant qualities."

Con Edison's engineers continue: "Our choice of FOAMGLAS involved maintenance considerations, too. Replacing or servicing insulation in our underground installation would involve considerable expense. We feel that FOAMGLAS will help us hold maintenance expense to a minimum."

It makes sense . . . if Con Edison can achieve such benefits from FOAMGLAS under difficult operating conditions, *you* can profit by using this unique, *cellular glass* insulation. FOAMGLAS laughs at the moisture that cuts efficiency of other insulations . . . and is fireproof and acid-proof, too.

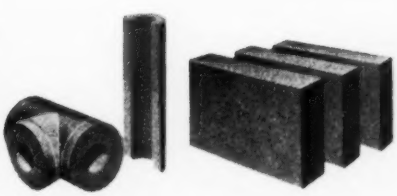
See our catalog in Sweet's Catalog Files . . . or send today for your sample and our booklets describing the use of cellular, *stay-dry* FOAMGLAS to insulate piping, tanks, and other equipment.



PITTSBURGH CORNING CORPORATION
Dept. PE-84, One Gateway Center • Pittsburgh 22, Pa.

FOAMGLAS®

the cellular, stay-dry insulation



PITTSBURGH PC CORNING

Pittsburgh Corning also makes PC Glass Blocks

For more facts circle 572 on Reply Card

NEW PRODUCTS AND PROCESSES summarized for your convenience

Edited by M. E. Heniken

1—SALT SPLITTER uses basic anion exchange resin

For small and medium sized plants, the Dealkalizer uses a strong basic anion exchange resin capable of salt splitting and substituting chloride anions, for bicarbonate, carbonate, sulphate and nitrate radicals. It is claimed this process of chloride anion exchange reduces alkalinity without use of acids, reduces CO_2 in steam, and provides continuous treatment under pressure. Company says that together with their Zeo-Flo Softener, the unit is designed to provide custom-engineered systems at practically stock costs. Cochrane Corp.

2—ROOFING, SIDING of cross-corrugated aluminum

Available in various gages, widths and lengths, this new roofing of cross corrugated aluminum roll has the recognized advantages of aluminum outside building materials and some others besides. The 50, 100 and 200-ft rolls lie flat when unrolled, like composition roofing, it is pointed out, and they can be handled quicker and easier, applied faster, cut easily and quickly and require less nailing.

Because of the length of the rolls which reach across the length of many buildings, side laps are eliminated, says manufacturer, and also the possibility of wind loosening sheets. This also saves on amount of material required. Further, it is noted that sheathing and decking aren't required, and that no re-spacing of rafters is necessary.

Cost of the roll roofing and siding will be about 10 per cent above that of sheet, but economies of installation are said to make this material expensive in the end. Quaker State Metals Co.

More information on any of these products can be yours without cost or obligation. Just circle the item numbers on the Reader Service Cards provided on pages 157-158.

4—METALLIZING GUN is smaller and lower priced

Even smaller plants can utilize metallizing for repair of machine parts with the L-Gun, designed for use where the volume of work doesn't warrant purchase of a regular heavy-duty metallizing installation. Manufacturer says the L-Gun is as ruggedly built as its bigger brothers, and its smaller size reduces its appetite for compressed air. It needs only 10 cfm, and will operate on as little as a 3 hp compressor. The gun will spray such metals as Babbitt bronze, carbon steel, stainless steels and zinc, by hand or machine mounting, on shafts, bores and tanks. Metallizing Engineering Co., Inc.

5—SHORT DRILL works in those hard-to-reach spots

The Model 123 is a powerfully built short drill designed for working in hard-to-get-at places. It has a ½ in. capacity in steel, 1⅜ in. in wood. Construction of the back spade handle allows it to be removed for an even shorter chuck line length, and the pipe handle is also removable. Chuck speed of this drill is 550 with no load, 330 with full load. Housed in die cast aluminum alloy, this drill may be had in five voltages from 115 to 250. Stanley Electric Tools.

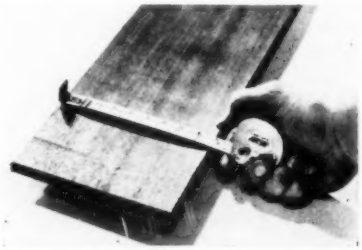
6—ACOUSTICAL TILE, for ceilings, in random design

In Fiberglas Random Perforated Acoustical Tile the perforations that trap noise are in an irregular, scatter pattern, in contrast to the straight line arrange-

ment of holes in other acoustical tile offered by this company. The new tile is available in 12-by-12 and 12-by-24 in. sizes. Its painted surface is washable and it can be repainted when desired. Owens-Corning Fiberglas Corp.

7—LUMBER RULE is compact and direct reading

Plant engineers who buy lumber know the value of checking for possible errors in board-foot measurements as shipments are received. The Lumtape is a pocket-size rule designed to make the job simpler and quicker. It is direct reading, requiring no arithmetic for converting



measurements to board-feet, and is calibrated for even or odd lengths to 16 board-feet. Tipped by a hook, the blade can be extended 10 ft for checking doubtful lengths. It has ⅛-in. markings.

Measuring with the Lumtape is described as a convenient one-hand operation because it fits the hand easily; its blade pulls instantly in or out to accommodate required width; and a thumb-lock holds the blade extended as long as necessary. It comes in a die-cast case, has a replaceable steel blade. Individual Lumtapes cost about $5.50; in sets of four the cost is somewhat less. Lumtape Corp.

8—MAGNETIC WAND does many jobs around plant

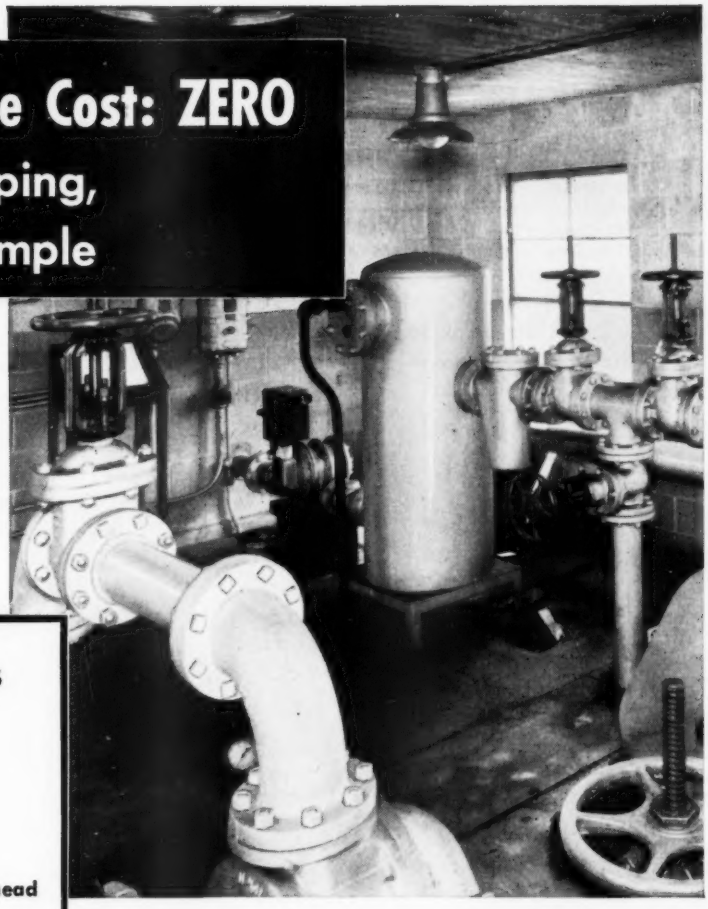
Even the smallest length (no longer than a kitchen fork) of the Wonder Wand is claimed to have the grip of a monster. It picks up small bits of iron, metal dust

3—UNGLAZED TILE, for stairways, is easily installed

Stairway erection cost is said to be materially lowered with Stairtread Tile, load-bearing, hard burned, de-aired clay tile treads in an unglazed buff shade. They are easily installed and require less steel—only plate stringers and angle iron stretches are necessary, it is pointed out. According to company, Stairtread Tile provides a complete structural unit, not just a wearing surface, and is permanently slip-proof. This surface is said to be easily cleaned, and impervious to cleaning compounds. No painting is required.

Tread and riser are made in separate units. Risers are designed to facilitate saw-cutting on the job. Standard units provide tread widths from 10 to 12¼ in. and riser heights from 4 to 10 in. Only three unit styles are necessary for construction of treads, risers, landings and floors. Floor and landing units are the same surface size as the risers. Riser units can be used for floors and landings, if desired, or half-thickness units can be furnished. Tread units can be saw-cut to make top and bottom treads. Structural details on Stairtread Tile are given in Bulletin ST-400. Natco Corp.

Valve Maintenance Cost: ZERO
...on fuel oil piping, for example



The Installation

At North End Yard, The Cincinnati Union Terminal Railroad, using Crane steel valves and fittings throughout diesel fuel receiving and filling system. Working pressure, 40 pounds.

Valve Service Ratings

SUITABILITY:
Doing the job as intended

FEATURES:
Exelloy seating

MAINTENANCE COST:
Zero

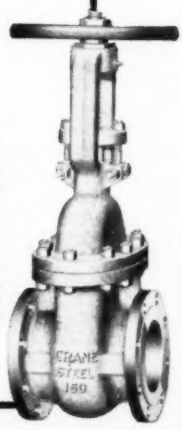
SERVICE LIFE:
Installed 1948—Shows long life ahead

OPERATING RESULTS:
Low-cost, trouble-free fueling

AVAILABILITY:
Crane catalog item—No. 47X

The Valve

150-Pound Steel Gate—with its exceptional performance assured by Crane quality design . . . by Crane pioneering skill in steel casting . . . and the high adaptability of Crane Exelloy trim for oil services. Sizes 2 to 24 in.; screwed, flanged, or welding ends. See your Crane Catalog, or ask your Crane Representative.



The Case History

Not until the terminal's engineers were convinced of its dependability and low-cost maintenance was any equipment bought for this project. Many similar systems were studied for the best means of assuring utmost economy of operation. The installation was made in 1948 . . . with welded piping where practical, using Crane materials exclusively—steel fittings, check valves, and No. 47X, 150-Pound steel gate valves.

More than 5 years later the terminal reports: Piping system operation entirely satisfactory; maintenance cost to date: zero. Further result: Crane valves have earned top consideration for proposed extension of system. The terminal knows the value of thrifty buying—quality always outweighs price-tag savings.

THE BETTER QUALITY...BIGGER VALUE LINE...IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

For more facts circle 573 on Reply Card

NEW PRODUCTS

(Begins on page 126)

and sharp metal particles in and around machinery. It removes objects from bins or barrels and can be used as a skimmer or coolant cleaner, as an underwater recovery magnet or magnetic attractor in inaccessible places. The Wonder Wand is stocked in lengths ranging from 8 to 32 in., can be ordered to suit individual plant needs. Eriez Mfg. Co.

9—FLOOR PREPARATION performs three functions

Surfa-Etch is offered as a solution to some problems associated with preparing concrete and cement floors and masonry surfaces for sealing and re-finishing. These problems include the alkalies which must be neutralized and etched so that the finish coating can take hold; safety risks associated with certain acids used; necessity for removing accumulated dirt, grease, oils and soap films after etching and prior to re-coating the surface.

Outstanding advantage attributed to Surfa-Etch is its safety factor, no special clothes being necessary when applying it. Company says it is fume-free, odor-free, non-inflammable and not damaging to metal surfaces in the room. Also, it is designed to clean, etch, and neutralize the surface in one application.

You apply Surfa-Etch liberally by brush or spray, after first scraping and

removing dirt, oil and grease. Then you scrub it into the surface with brush or electric floor machine. When Surfa-Etch comes into contact with the alkali, the effervescing action shows that alkali is being "boiled out" from the surface pores. After rinsing with clear water and drying thoroughly, the surface is ready for the sealer. Rust-Oleum Corp.

10—IMMERSION HEATERS for water baths and tanks

Single and double flange-type heaters have been added to this company's Calrod immersion heater line. Designed to operate on either a-c or d-c circuits at 115- or 230-v, they can be used in cleaning tanks, humidifiers and quench tanks. Offering a high watt density, they are formed by bending a Calrod tubular unit into hairpin shape, the ends of which are brazed into a flange.

A silicone seal and porcelain insulator are incorporated at the heater's terminal ends for protection against vapors and liquids, and to provide electrical insulation. Terminal connectors are welded to low-resistance cold terminals, attached to the resistance wire. Suitable for maximum working pressures to 125 psi, according to company engineers, the heaters are engineered to meet low-pressure boiler specifications of the ASME. Heaters have shipping weights of 1¾ to 2¼ lb. General Electric Co.

11—UNIT HEATERS for hot water, steam operation

This redesigned line of unit heaters for steam or hot water operation includes both horizontal and vertical types offered in a wide range of sizes. According to manufacturer, they operate quietly and are tested, rated in accordance with Standard Test Codes, and are competitively priced. Full details on the heaters are provided in Bulletin 7517. The American Blower Corp.

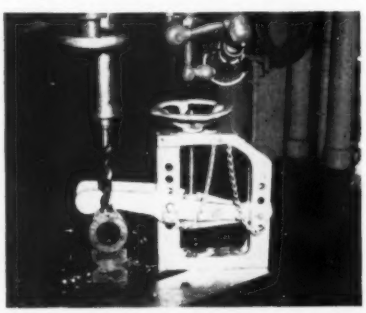
12—TIMING INSTRUMENTS simplify process checking

Plant engineers can have a continuous check on process systems and equipment by using the Time-Recorder-Totalizer or the Time-Totalizer, says manufacturer; either instrument simplifies checking of processes, equipment, or personnel. The Time-Recorder-Totalizer is suggested for use where an uninterrupted record of when and how equipment is used is desired. On a continuous tape, a permanent record shows chronologically when the process or equipment is on or off. It records operation of any process, whether operated automatically or manually, and in addition to the tape recording, the total operating time is totalized.

The Time-Totalizer can be mounted or connected to electrically operated equipment. Like an adding machine, it totals the operating time of the equipment. Heat-Timer Corp.

13—HOLD-DOWN CLAMP for machining operations

Advantages announced for the Safety Adjustable Clamp include saving in set-up time, new safety features, suitability for either precision or production work, and provision for 8000 psi equalized pressure with compound leverage. The device simply clamps to a T-slot table, the adjustable pins are set, the work inserted, the leverage wheel turned—and you're ready to go. Pictured is the 12-in. model, designed for heavy duty industrial production, which sells for around $45.00. A 6-in. model for general machine shop



use and a 4-in. model for smaller shops will soon be marketed. Manufacturer points out that the clamp works just as well on the side of the table as on top. Safety-Adjustable-Hold-Down Clamp Co.

14—RIGID PLASTIC PIPE is lightweight and tough

Rigid Koroseal pipe, claimed to have the highest resistance to shock and impact known in the plastics field, is announced. Developed for use in industrial and chemical plants, the new thermoplastic material makes available a non-metallic pipe described as tough, durable and capable of withstanding rough handling and hard usage under severe operating conditions. The new pipe and fittings weigh only

about a quarter as much as standard steel pipe, in many services are said to outlast steel, copper, cast iron, stainless.

According to manufacturer, the pipe is chemically resistant, odorless, won't rust or corrode, and has excellent aging properties for indoor, outdoor and underground use. It is available in lengths to 20 ft, diameters from ½ through 2 in. It will be furnished with threaded fittings for ready disassembly and re-use. Gray in color, with a shiny smooth surface, inside and out, it may be finished with vinyl base paints where color coding is required. Industrial Products Div., The B. F. Goodrich Co.

15—PUMPS, vertical shaft, wet or dry pit units

These new vertical shaft pumps are announced as affording a wider choice of settings, higher heads and greater design flexibility for abusive pumping applications. The series is comprised of the Types CWO and CWS, wet pit units for submerged applications, and the Types CDO and CDS, dry pit units for outside mounted applications. The CWO and CDO units have no submerged bearings. The other two types have submerged bearings and are available in extended setting lengths by the inclusion of additional intermediate bearings.

All of the pumps are available with packed or sealed stuffing boxes at floor level. Like other pumps manufactured by this company, these are designed for abusive service, either abrasive or corrosive—such as handling tailings, slurries, slimes or acids, or for handling molten metals or salts up to 1200 F. Nagle Pumps, Inc.

(More New Products on page 132)

Here's a one-punch knockout for acid vapor corrosion

THIS blast furnace blending room roof gets a steady diet of sulphurous acid, high moisture and coke fumes. It's enough to make any metal cry Uncle. But one economical, easy-to-apply application of *Pitt Chem* Tar Base Coating licked this rugged corrosion problem.

No matter how large, small, simple or complex *your* corrosion problem is, your best chance of solving it is with *Pitt Chem* Coatings. They are formulated to fully utilize the excellent resistance of coal tar pitch to moisture, mineral acids, alkalis and weather. No other material does such a complete job of protection at so little cost.

If you have a corrosion problem that's stumping you, why not have your engineers get together with ours. It's a business-like move to protect your investment in plant and equipment. A call is all that's needed. Or see our catalog in Sweet's Plant Engineering File.

Write For FREE Corrosion Control Booklet

Tells where tar base coatings can save you money in your plant . . . what grades to use . . . how to apply them.

W&D 4967

PROTECTIVE COATINGS DIVISION

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COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

For more facts circle 574 on Reply Card

How Well Does Your Present Source Compare With National's COMPLETE Facilities For Motor and Generator Repair

Most motor repair shops can perform some of the operations listed below. Very few can handle them all. These are not routine operations, but extras which require expensive specialized equipment and experience. National service includes all 17 operations. How does your present repair source compare?

plus value operation	*available at National*	*at your present repair source*
1. redesigning and modernizing by competent engineers	yes	
2. vapor degreasing to insure good bonding of varnish	yes	
3. corncob blasting to prepare surfaces like new	yes	
4. rebuilding and remachining to standard of mechanical fits	yes	
5. temporary hotbanding to seat coils in slots	yes	
6. hot rerolling of permanent bands	yes	
7. grinding and polishing of journal shafts	yes	
8. vacuum impregnating	yes	
9. dynamic balancing	yes	
10. grinding and polishing of commutator at top operating speed	yes	
11. load testing	yes	
12. high frequency testing	yes	
13. electronic bar-to-bar and high sensitivity ductor testing	yes	
14. surge comparison testing	yes	
15. high potential ground testing	yes	
16. magniflux testing	yes	
17. anti-friction bearing inspection	yes	
Total	17	

If you can't answer "yes" for your present source on all 17 operations, you're taking unnecessary chances on getting less than the best repair work. You can't tell in advance on which jobs National equipment and National know-how will pay off in improved performance or longer life. So play it the one safe way — make National your first source for *all* motor and generator repairs.

For more details on why the motor or generator you send to National will often come back better than new, call your nearby National field engineer today. Or drop us a line for his name and address.

NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO, U. S. A.

ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION
REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

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Plus Values of ELPAR Trucks:—

- Over 100 models of *ALL* types—fork, low lift and high lift platform, crane.
- Pennies per day to operate due to quiet, fume-free ELECTRIC power.
- Packaged unit design assures instant accessibility for preventive maintenance.
- 48 years' experience designing SPECIAL trucks for unusual load or operating problems.

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Illustrated Catalog tells why ELPAR *gives you more for your truck dollar.*

The ELWELL-PARKER Electric Co.
4178 St. Clair Ave., Cleveland 3, Ohio

Please send your ELPAR Truck Catalog.

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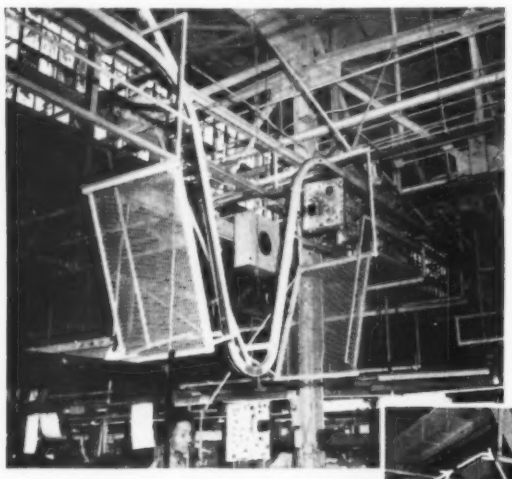
...a T-V set is born



• "Bare Chassis" conveyor in RCA plant is over 1,000 feet long. Here ZIG-ZAG is used for both production-flow and moving storage of television receiver chassis.

• "Record Conveyor," 1,800 feet long, is inverted type. ZIG-ZAG operates upside down in 10-inch deep trough, pushing boxes of finished records to packing department and warehouse.

with the help of

"Zig-Zag"®

Continuous Power Conveyors

The Radio Corporation of America's plant at Indianapolis, Indiana, turns out hundreds of television receivers every day. Even the slightest hitch in production-flow can seriously hamper vital deliveries to dealers.

To expedite handling, RCA installed several Richards-Wilcox ZIG-ZAG Continuous Power Conveyors to keep things moving smoothly, both on production lines and in transport between divisions. They help boost TV and phonograph record production by eliminating production bottlenecks.

RCA chose ZIG-ZAG for the same reasons so many other manufacturers have done so—because it's quality designed and manufactured for years of low-cost, trouble free service. Because of its flexibility, operating continuously "up, down, in, out and around" anywhere overhead, releasing valuable floor space and personnel for other jobs. And because when changing conditions make alterations necessary, ZIG-ZAG Conveyors can be relocated by plant personnel, usually without loss of a single part.

Whatever your problems in materials handling, R-W ZIG-ZAG Conveyors can help you solve them. With carrying pendants located on 6-inch centers, ZIG-ZAG is designed to handle any load a man can lift in continuous production. A choice of drive units permits travel at any required speed with variations of 10 to 1 or better. For complete details on R-W ZIG-ZAG Conveyors, write us or consult an R-W Engineer, at no obligation.

1880 RICHARDS WILCOX R-W AURORA 1954

SLIDING DOOR HANGERS & TRACK • FIRE DOORS & FIXTURES • GARAGE DOORS & EQUIPMENT • INDUSTRIAL CONVEYORS & CRANES • SCHOOL WARDROBES & PARTITIONS •

Richards-Wilcox Mfg. Co.

MATERIALS HANDLING DIVISION
Branches in Principal Cities

460 THIRD STREET, AURORA, ILLINOIS

For more facts circle 577 on Reply Card

NEW PRODUCTS

(Begins on page 126)

16—GAGE CUTOUT protects against line pressures

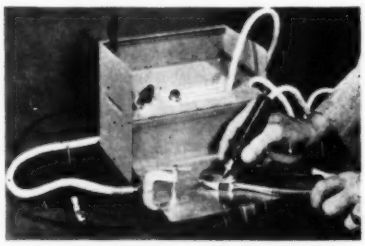
This gauge cutout is designed for low cost protection against excessive line pressures which damage gages, meters and instruments. Accuracy of control; sensitive response at pressures as low as

10 psi; and lightweight aluminum, corrosive resistant body, are some advantages cited. Cutouts are available in two models: low presure, with ranges from 10 to 300 psi; high pressure, from 100 to 3000 psi. A low rate spring may be substituted in either model (pressure ranges run from 10 to 60 psi in low pressure; and from 100 to 600 psi in high pressure). Greer Hydraulics, Inc.

17—ETCHING TOOL for marking the metal parts

Permanent marking of tools, dies, jigs, parts, materials, machinery and finished metal parts can be done quickly with the Staco Electric Etcher. It consists of a lightweight etching tool with alloy-tip point, 5½-ft cord and plug, ground clamp and flexible asbestos cables. Compact and portable, it is intended for burning identification or model numbers in metal.

Handled like a pencil, the etching tool can be continuously used since cooling air circulates around the tip. Depth of



mark can be varied by any of four etching heats. Ground clamp can be attached to objects too large to place on the work space. The isolated transformer is air cooled. Three models are available: for 115 v, 50-60 cycle; for 230 v, 50-60 cycle; and for 115 v, 25 cycle. Standard Electrical Products Co.

18—PLATING PROCESS is faster and more versatile

An improved nickel sulfamate plating process is reported to plate 75 per cent faster, produce harder deposits with less brittleness, and be more versatile and easier to control. Nickel sulfamate baths are commonly used for applying heavy coatings in electroforming, electrotyping and re-sizing operations. The new baths

Improve Your Combustion Control with ROCKWELL "120" GAS PRESSURE REGULATORS

Get Better Performance and Economy From All These:

- INDUSTRIAL FURNACES
- OVENS AND KILNS
- LARGE APPLIANCES
- SPACE HEATERS
- GAS ENGINES
- ALL LOW PRESSURE "CLOSE CONTROL"

No matter what you are processing with gas, the quality of your end product depends upon the degree of combustion control you can maintain. With Rockwell "120" regulators it's no problem to hold an even, constant pressure at the burners. They have a large area diaphragm and friction free control movement to assure maximum sensitivity and long life. By making slight alterations to standard construction the Rockwell "120" can be used as a back pressure regulator, a pressure relief valve, a non-return valve, a flow controller, a shut-off valve or a proportioning control.

In many applications remote control can be applied to permit the regulator to anticipate pending changes in flow rate or pressure.

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Please send me your bulletin describing the "120" regulator ☐. Please quote me on_____" SIZE regulators ☐. Please have your representative call ☐.

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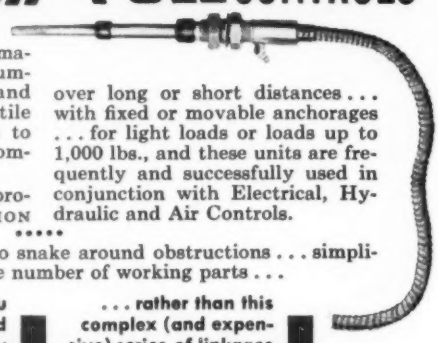
For more facts circle 578 on Reply Card

IMPROVED OPERATION OF LITERALLY HUNDREDS OF MECHANICAL PRODUCTS HAS BEEN EFFECTED WITH ACCO TRU-LAY FLEXIBLE *PUSH*-PULL CONTROLS



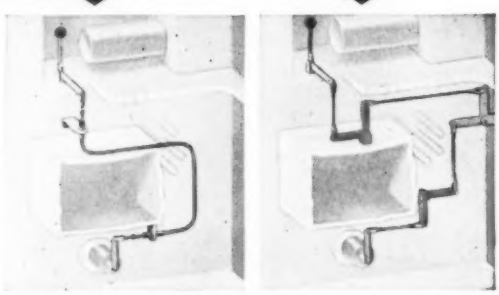
If you would like more information, after reading this brief summary of the characteristics and widespread use of this versatile Remote Control, just ask us to send you our **IDEA FILE** with complete Application Data.

Tru-Lay Push-Pull Controls provide POSITIVE REMOTE-ACTION over long or short distances . . . with fixed or movable anchorages . . . for light loads or loads up to 1,000 lbs., and these units are frequently and successfully used in conjunction with Electrical, Hydraulic and Air Controls.

• • • • •

Flexibility makes it possible to snake around obstructions . . . simplifies installation . . . reduces the number of working parts . . .

to give you this simple and effective assembly ↓ **. . . rather than this complex (and expensive) series of linkages** ↓



POSITIVE REMOTE-ACTION and FLEXIBILITY together with Precision and Long Life, explain why TRU-LAY PUSH-PULLS serve designers and users equally well in improving machine operations, whether the application is on such severe service jobs as Bulldozers, Power Shovels and Steel Mill Machinery, or on such light duty work as Photographic Equipment, X-Ray or Business Machines.

Immunity to Vibration makes these TRU-LAY PUSH-PULLS ideal as Remote Controls on shakers and other vibratory products.

Complete Protection Against Dirt and Moisture is a big factor in the use of this unit on machinery in Coal Mines, Cement and Steel Mills, Oil Fields and in many other industries.

Corrosion-Resistance of the unit, plated or with Stainless Steel construction as required by the use, has led to many applications in the Marine Field . . . salt water or fresh. Supplied with a rubber cover the unit operates effectively even when conduit is COMPLETELY IMMERSED.

Lubrication of the inner working member is taken care of for life.

Temperatures as low as −70° F. will not hinder the proper operation of this unit, and it is thoroughly effective even in the extreme high temperatures encountered on Jet Engine, Furnace Door and Glass Furnace Damper control applications.

It is more than likely that you will find ACCO TRU-LAY *Flexible* PUSH-PULL CONTROLS doing a good job on some or many of the products used in your own business . . . on your drinking fountains, business machines, factory lift trucks (gas or electric) to control tilt and lift, or in your power or heating plant, perhaps controlling the pitch of blades on a big exhaust fan. The full list of applications is simply tremendous.

Send for this IDEA FILE *This* **IDEA FILE** *will answer most of the questions you may have in mind as to how you might make additional applications of this versatile and dependable tool. Write for a copy, without obligation.*

NEW IDEAS

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AUTOMOTIVE and AIRCRAFT DIVISION
AMERICAN CHAIN & CABLE

601 Stephenson Bldg., Detroit 2
2216 South Garfield Ave., Los Angeles 22 • Bridgeport 2, Conn.

For more facts circle 579 on Reply Card

NEW PRODUCTS

(Begins on page 126)

are claimed to plate up to 0.0007 in. of nickel per hour as compared to the 0.004 in. per hour possible with many baths now in use. Operation at current densities of 140 asf is responsible for this higher speed, says company.

With the new process, deposits of low internal stress are easily obtained, it is pointed out, and a wide range of specific compressive and tensile strengths are possible. These may be had by varying current density, temperature and concentration of the bath's addition agent. The bath is made up of nickel sulfamate, nickel chloride, boric acid and an addition agent. Pitting is no problem, it is claimed; solutions require no wetting agent.

Additional features of the process are said to include heavy deposits, air agitation, use of any type high purity nickel anode. According to company, this bath is not sensitive to impurities, either organic or metallic, but if excessively contaminated it can be purified with activated carbon and low current density electrolysis. Heating, filtering and pumping equipment may be made of Karbate, nickel or rubber and lined with Koroseal or Saran. Stainless steel may be used in spots where bare metal cannot become anodic. Hanson-Van Winkle-Munning Co.

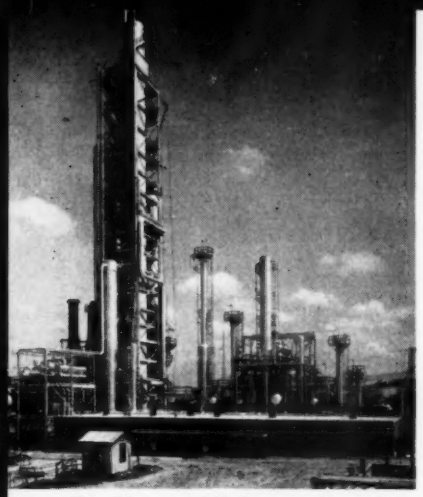
19—SOLDERING GUN is lightweight, quick heating

The Model 199 Quick-Hot Electronic Soldering Gun, for use in light production jobs and plant maintenance, is described as lightweight (1½ lb), small enough to slip into a tool kit, and balanced

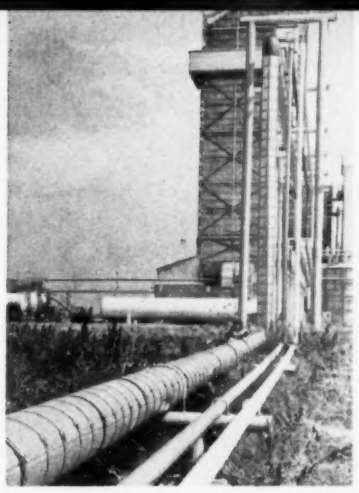
for accurate use. When plugged in on ordinary 110 to 120 v a-c, 60-cycle, manufacturer says, it is working hot 2½ sec after the trigger is pressed—cooling quickly upon its release. Its spotlight is designed to automatically illuminate work and the extra long nosed tip to reach into the tight spots. It is priced at less than $8.00. Wen Products, Inc.

20—PAINT for galvanized iron or zinc surfaces

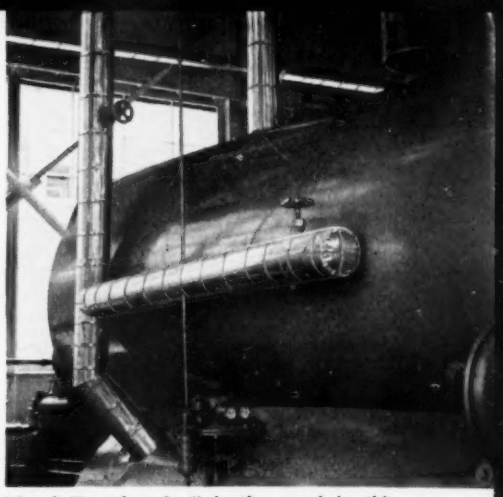
Zincoater, a paint formulated to firmly adhere to galvanized iron or zinc surfaces, combines metallic zinc dust with a phenolic resin vehicle and tung oil. The result is a durable gray finish that can be covered with enamels or other paints.



This big new Oklahoma refinery has used a new kind of aluminum jacketing throughout on both insulated lines and towers and vessels. Light in weight and low in cost, this new Childers Aluminum Jacketing cut installation costs. It is also expected to cut maintenance costs.



Childers Aluminum Jacketing is used here on a cross-country transfer line at a large chemical manufacturing plant in Texas. This is a rugged test for any jacketing, but the light-weight aluminum used in this jacketing should stand up to weather and chemical corrosion it encounters.



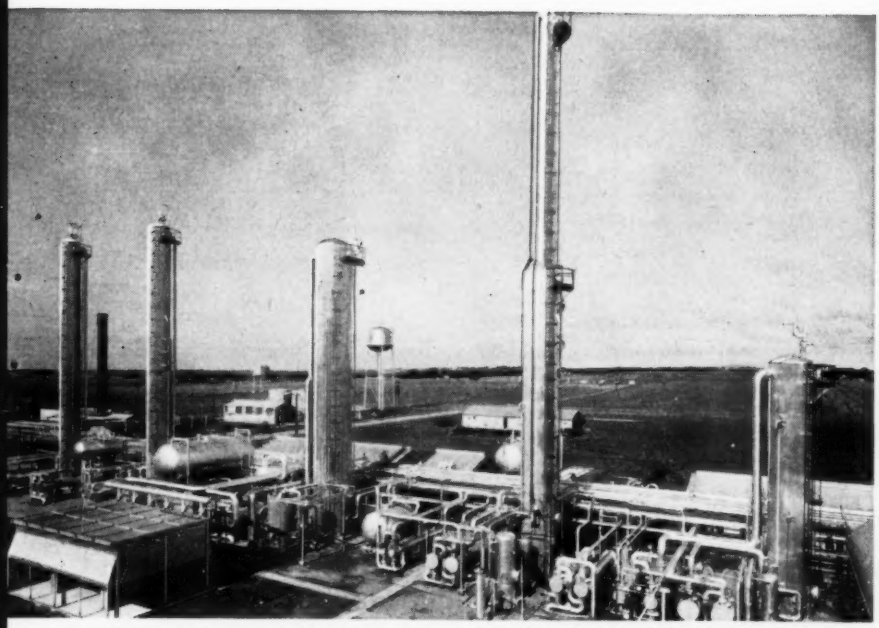
"Good Housekeeping" is the word in this gas pipeline pump station. The insulated lines are handsomely protected by Childers Aluminum Jacketing, which should last as long as the plant itself. The jacketing requires no painting and very little other maintenance. It even allows the interior of the plant to be washed with a hose without harm to the insulation. The chief engineer reports: "We have standardized on Childers Jacketing for all our insulated lines. It is doing an excellent job for us and saving us money."

How 5 plants cut costs of jacketing insulated lines

Weather-resistant, low-cost, easy to put on—these are big reasons for the growing popularity of a new jacketing, specially engineered for insulated lines. It is made of .006" thick aluminum and comes with or without a moisture barrier. It is called Childers Aluminum Weatherproof Jacketing. You can write for a free sample without obligation.

Address Childers Manufacturing Co., Dept. PLE-3, 3620 W. 11th St., Houston 8, Texas.

Under CMP regulations, Childers is a Class B product, the use of which is not restricted.



Weather, wind and corrosive gases are not going to attack the insulation of this new plains-country gasoline plant. The insulation is protected by long-lasting aluminum: Childers Aluminum Weatherproof Jacketing. The management expects this low-cost jacketing to hold insulation maintenance costs to a minimum. Other advantages are that the jacketing went on quick and easy during construction; it required no special tools or skill — no shop forming or cutting. It can be taken off and re-used if lines are moved. Aluminum saves on painting and the tough 35 alloy used for Childers Jacketing should stand up for years even in highly corrosive industrial atmospheres. Check the advantages of this jacketing for your own plant.

Amazingly easy to handle, Childers Jacketing was applied here by men using no more than a wooden wedge and a pair of pliers. Childers has engineering representatives in every major industrial center who will be glad to confer with you on your particular jacketing problems. Write to address shown above.

Advertisement

For more facts circle 580 on Reply Card

STAINLESS STEEL TANK

Used for Nitric Acid Storage

The 5,000-bbl. Horton® stainless steel tank, shown in the above view, was installed to handle 60 per cent nitric acid at the Sterlington, La., plant of the Commercial Solvents Corporation. The tank, 35-ft. in diam. by 35-ft. high, is corrosion-resistant and easy to maintain.

Welders employed on the shop fabrication of this stainless steel tank were specially trained for work on corrosion-resistant structures. Welding of stainless steel requires different techniques . . . and all Chicago Bridge & Iron Company welders must pass qualification tests before they are allowed to weld this particular metal. This is standard practice on all corrosion-resistant structures we build, and it assures you of the best tank your money can buy.

Chicago Bridge & Iron Company has complete facilities at all four strategically located plants to engineer, fabricate and erect welded steel plate structures made of carbon steel, stainless steel, aluminum or other corrosion-resistant materials. Write our nearest office for further information, estimates or quotations. There is no obligation on your part.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3	2148 Healey Building	Los Angeles 17	1574 General Petroleum Building
Birmingham 1	1555 North Fiftieth Street	New York 6	3317-165 Broadway Building
Boston 10	1067-201 Devonshire Street	Philadelphia 3	1649-1700 Walnut Street Building
Chicago 4	2134 McCormick Building	Pittsburgh 19	3243 Alcoa Building
Cleveland 15	2258 Midland Building	Salt Lake City 4	570 West 17th South Street
Detroit 26	1569 Lafayette Building	San Francisco 4	1582-200 Bush Street
Havana	402 Abreu Building	Seattle 1	1370 Henry Building
Houston 2	2166 C & I Life Building	Tulsa 3	1669 Hunt Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

NEW PRODUCTS

(Begins on page 126)

Manufacturer says there is no harmful chemical reaction between Zincoater and either the galvanized surface or finish coat. It may be applied by brush, roller or spray, dries in two hours. One gal covers about 700 to 800 sq ft when brushed on. Available in 1-gal cans, it is packaged in a two-compartment container for convenient mixing. Unmixed portions remain stable, says company. The Tropical Paint & Oil Co.

21—INSTRUMENT measures closed tank liquid level

A "differential converter" for measuring the level of liquids in a closed tank, either under pressure or vacuum, converts differential pressure into proportionate air pressure which, in turn, is transmitted to indicators, recorders and controlling equipment. The instrument uses a pneumatic balance weigh-beam system, is small and weighs only 28 lb. The range is adjustable in field applications from 0-14 to 0-200 in. of water. The level reading over entire range is continuous.

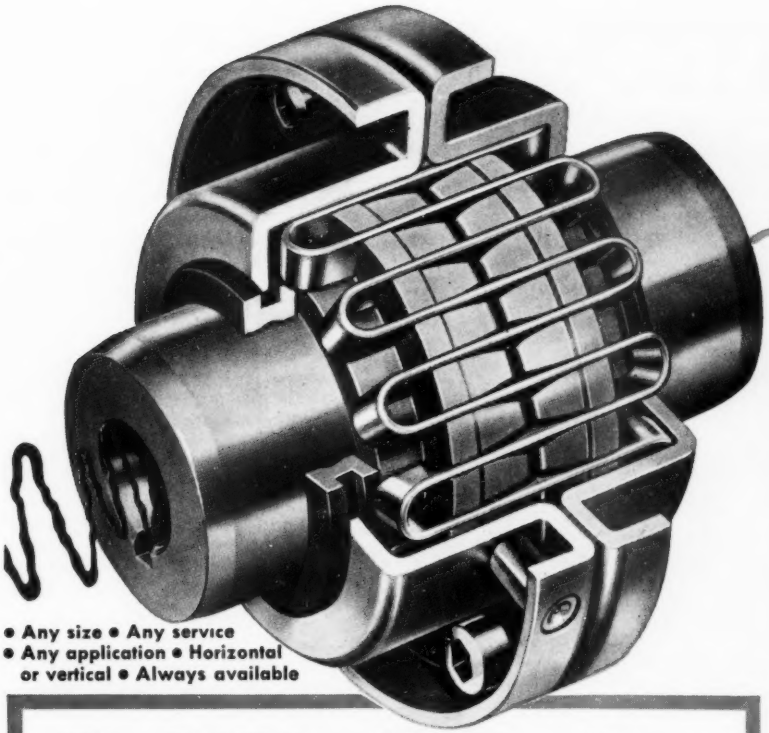
Available with both steel and stainless steel bodies, the unit is designed to withstand temperatures to 350 F and is rated for pressures of 750 or 1500 psi. When used with strip or circular chart recorders, it can furnish records for operation analysis, inventory checks and cost accounting purposes. Bulletin 2291 gives additional information. Industrial Div., Minneapolis-Honeywell Regulator Co.

To receive product data circle item numbers on the handy Reader Service Cards provided on pages 157-158.

22—BUTT-WELDING TOOLS are plier-action operated

Koldweld Buttweld Tools KB-14 and KB-14B are designed to butt-weld different sizes of same or dis-similar nonferrous metals together without heat, electricity or chemicals, and declared simple enough for operation by anyone who can handle a plier-action 5-lb. tool. According to manufacturer, these 14-in. tools actually produce faster and better welds.

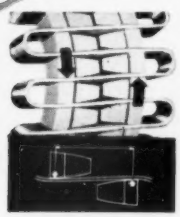
The KB-14B welds aluminum and copper, and aluminum to copper wire in a range from 0.039 in. (No. 18 gage) up to but not including 0.063 in. (No. 14 gage, 0.064 in. nominal). The KB-14 handles copper wire from No. 14 gage up to 0.089 in (No 11 gage, 0.091



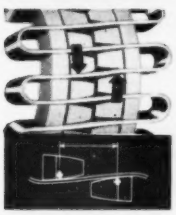
• Any size • Any service
• Any application • Horizontal or vertical • Always available

Exclusive FALK Steelflex grid-groove design smothers shock and vibration.

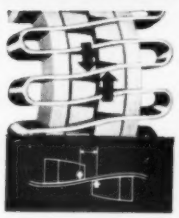
The damaging effects of shock and vibration can shorten the life of any connected machinery. Here is how the Steelflex grid-groove design overcomes these common enemies.



Under LIGHT LOADS
The gridmember bears only at outer edges of grooves. The long span between points of contact remains free to flex under load variations.



Under NORMAL LOADS
As load increases, the distance between supports on the grooves is shortened proportionately, but a free span remains to cushion shock loads.



Under SHOCK LOADS
Under extreme overloads, the grid-member bears fully on the grooves and transmits full load directly. The coupling remains flexible, within its rated capacity.

Why FALK Steelflex Couplings give the *finest* protection for connected machinery

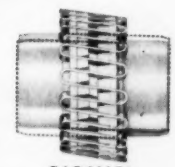
Maximum protection of connected machinery is best provided by Falk Steelflex Couplings because, thanks to their exclusive design, they overcome the damaging conditions of shock loads, shaft misalignment and vibration. How this unique multiple protection is made possible is shown at the right.

Falk Steelflex Couplings give the most economical protection, too, because they make connected machinery last longer and give better service. Furthermore, when actual coupling costs are figured per year of service, Falk Steelflex Couplings show substantial savings through their rugged all-steel construction, easy interchangeability and low maintenance requirements.

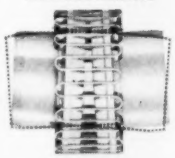
The basic Type F Steelflex Coupling—in 33 sizes to cover capacities from 2/5 through 70,000 hp per 100 rpm—meets over 90% of all industrial applications. Special or Dual Purpose Steelflex Couplings are available for problem applications. Write to Department 247 for engineering bulletin, including selection and dimension details.

...Accommodates shaft misalignment and free end float

Basic maintenance procedure dictates regular inspection and correction of shaft alignment. Between inspections, Steelflex couplings provide protection by accommodating unavoidable shaft misalignment and end float. The gridmember which connects the two hubs of a Steelflex coupling is not fastened to either hub, so each hub can shift without imposing load on the other shaft.



PARALLEL MISALIGNMENT



ANGULAR MISALIGNMENT

FREE END FLOAT

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

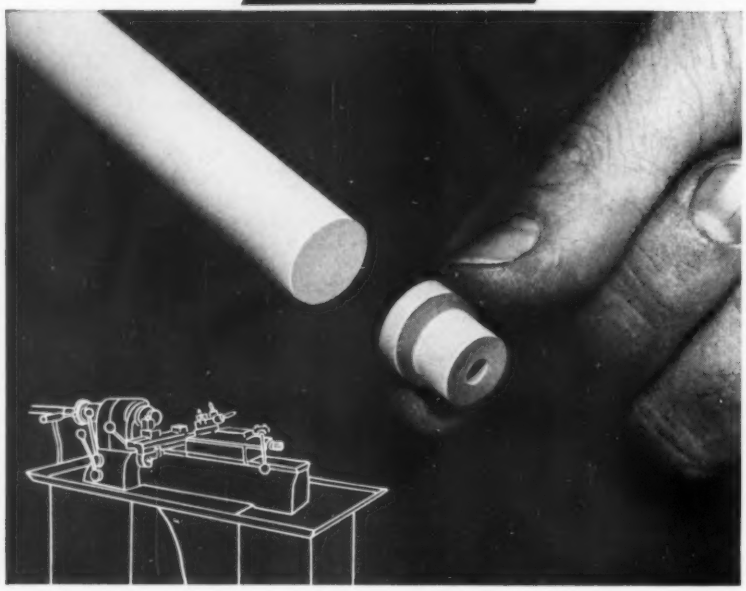
- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

...a good name in industry

For more facts circle 582 onReply Card

POLYPENCO® NYLON SHAPES



Nylon Parts Machined in Your Own Shop Can End a Host of Maintenance Problems

• Now it is economically possible to use nylon repair parts that last longer . . . need no lubrication . . . don't score contacting surfaces . . . and put an end to backlash, noise or corrosion. All it takes is POLYPENCO nylon rod, tubing, strip or slab plus the metalworking tools in your own shop. From these stock shapes, it's easy to make gears, bearings, bushings, cams, rollers and many other parts. Since expensive molding dies are eliminated, you can make one part or hundreds with the same economy. You also get these advantages:

- Easy machining—no special operator training or skill required
- Technical help in using and fabricating POLYPENCO nylon shapes
- Immediate warehouse delivery of most standard sizes
- Uniform high quality in every piece

Write for information on the use of POLYPENCO nylon shapes to solve your problems.

The POLYMER CORPORATION of Penna. • Reading, Penna.
In Canada: Polypenco, Inc., 2052 St. Catherine W., Montreal, P.Q.

POLYPENCO® NYLON
... teflon* and other non-metallics

Warehouse stocks: Reading • Chicago • Los Angeles • Newton (Mass.) • Branford (Conn.)

*trademark for DuPont tetrafluoroethylene resin

For more facts circle 583 on Reply Card

NEW PRODUCTS

(Begins on page 126)

in. nominal) : also aluminum and aluminum to copper wire in a range No. 14 gage to 0.127 in. (No. 8 gage, 0.128 nominal). Utica Drop Forge & Tool Corp.

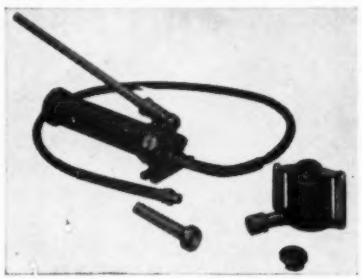
23—PLATFORM TRUCK of magnesium, is light, strong

An all-magnesium, four-wheel platform truck for general materials handling is available in 10 models, each weighing only ¼ to ⅓ as much as comparable equipment of similar size, says manufacturer. All trucks are capacity rated to handle loads to 1,000 lb.

Design improvements include standard, replaceable parts. Reversible handles can be installed at either end of the platform. They are also interchangeable, can be replaced with special racks or superstructures for many uses. Magline, Inc.

24—POWER UNIT for the pushing and pulling jobs

A portable, single-ram hydraulic power unit for pulling or pushing gears, wheels, bearings or parts, and for pulling or pushing cylinder sleeves, the Hydragrip consists of a small, hand operated hydraulic pump, connecting hose and single-ram hydraulic actuating unit. With a



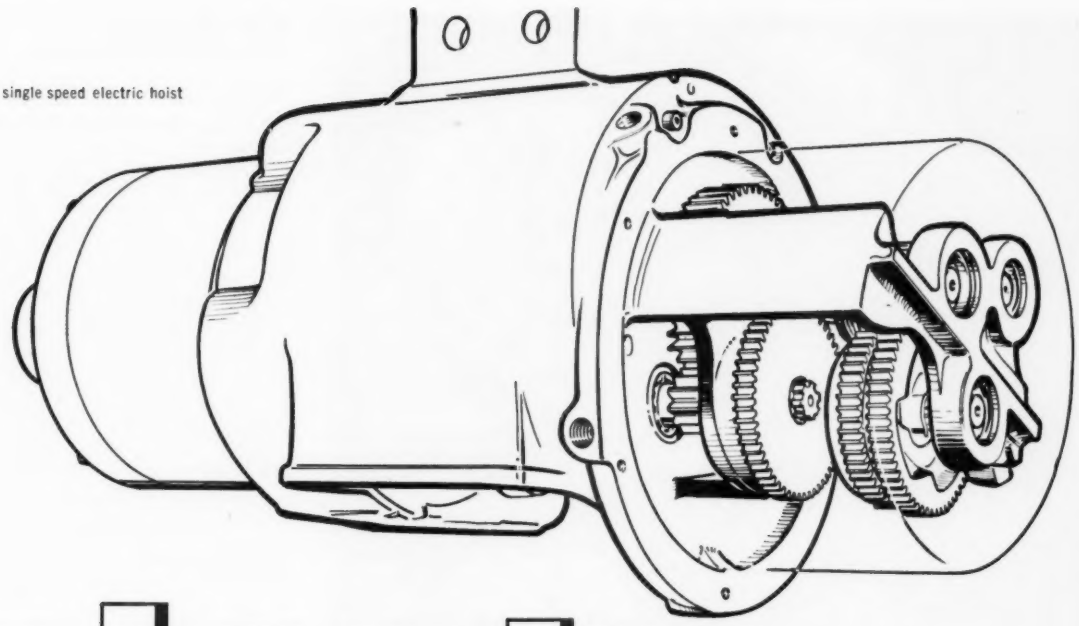
few strokes of the pump handle, the Hydragrip develops thrusts up to 35,000 lb, it is noted. The power unit has a single ram placed concentrically in the cylinder for accurate alignment of thrust along the center line of the puller's forging screw. This design feature is claimed to prevent wedging, binding and power loss.

The pump handle is not only designed to prevent "barking" of knuckles, but also to serve as a carrying handle. It is equipped with a manual pressure relief valve and independent safety valve. Armstrong-Bray & Co.

25—CORROSION INHIBITOR has double-punch action

Portions of this crystalline amine nitrite compound volatilize rapidly to prevent rust almost immediately, it is explained, while other constituents evaporate more slowly for longer lasting protection. The new material, VPI-250, is also said to flow more freely than previous inhibitors. It is a fine white powder which can be applied with squeeze bottle or salt shaker. Where spraying or dusting is impractical,

Type "J" single speed electric hoist



plenty

of everything to spare

STRENGTH TO SPARE—Robbins & Myers "J" Hoists are loaded with strength—extra strength in the frame, in the shafts and gears, in the cable and hook. They are built to lift your loads . . . today, tomorrow, and for years.

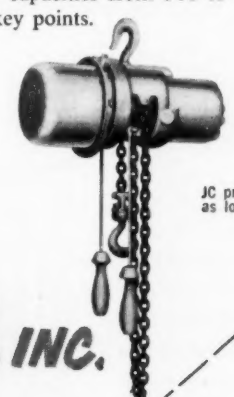
POWER TO SPARE—Special Robbins & Myers hoist motors, rated conservatively with ample reserve for overloads, make "J" Hoists integrated units. One maker responsibility guarantees matched parts of higher quality without question.

SAFETY TO SPARE—Twin safeguards—an oversized shoe brake on the motor and a Weston-type load brake with non-reversing clutch—give instant control over the load. Flanges and a limit switch keep the cable and hook from over-riding the drum.

PRECISION TO SPARE—Close tolerances . . . long life bearings . . . perfect sealed lubrication . . . have been liberally engineered into "J" Hoists. They give you most hoist and hoistwork per dollar invested.

(R & M "JC" electric chain hoists, give the most hoist per dollar and *at the lowest price today*. Single and double chain reeving—capacities from 500 to 2,000 lbs.) Stocks available at key points.

Load Capacities	500 to 4,000 lbs.
Headroom required	20″ to 31″
Speeds	15-30 f.p.m. for 220-440-550V 3-phase 60 cycle, or 110-220V single-phase.
Suspension	Lug, hook, push, hand-geared, and motorized trolleys.



JC prices start as low as $188.00.

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ROBBINS & MYERS, INC.

SPRINGFIELD, OHIO | BRANTFORD, ONT.

VENTILATORS · MOYNO PUMPS · HOISTS · CRANES · MOTORS & GENERATORS · FANS

clip
staple to letterhead
add name & title

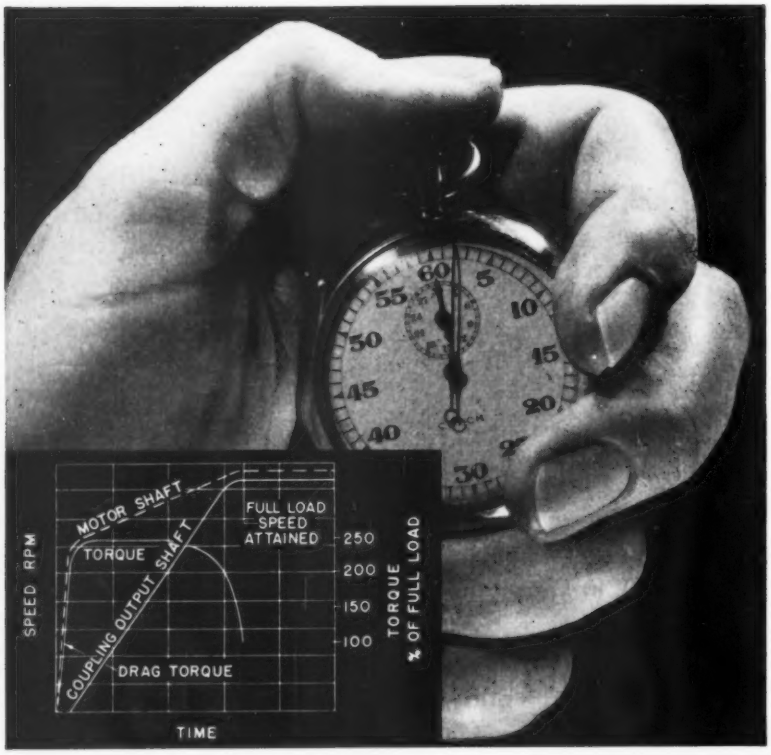
Please have representative call ☐

Please send J hoist bulletin No. 451 ☐

Please send JC hoist bulletin No. 852 ☐

PLANT ENGINEERING

For more facts circle 584 on Reply Card



How to get your motors out of the high heat curve... *fast*

Thousands of equipment owners have already proved it: the fastest way to get a normal induction type motor "out from under the load" and up to normal rpm—and keep it there without shocks and vibrations—is through the fluid "slip" within a Twin Disc Double-Circuit Fluid Coupling.

By *eliminating* mechanical connection, Twin Disc Fluid Couplings permit *full acceleration of motor under load within a few seconds* . . . while the output shaft of the fluid coupling transmits *full* input torque of the motor, and brings the load up to speed *smoothly* and *gradually*.

In addition, Twin Disc Fluid Couplings offer such advanced performance features as *Double-Circuit design* . . . making them the *most efficient fluid drives available today*.

Write Twin Disc—Dept. DS, Racine, Wisc.—for *complete* information! Ask for Bulletin 144-D.

Twin Disc Fluid Couplings are available in 9 different types (HYDRO-SHEAVE® Drive is shown), with the broadest variety of input, output combinations, and in sizes from 7.4S to 27 to accommodate motor- or engine-installations from fractional to 850 hp.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin
Hydraulic Division, Rockford, Illinois

For more facts circle 585 on Reply Card

NEW PRODUCTS

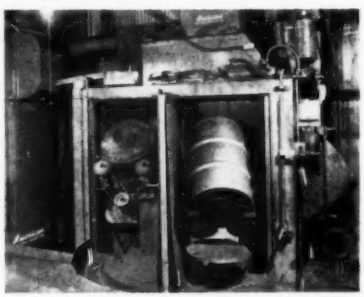
(Begins on page 126)

the powder may be dissolved in alcohol and applied in solution.

Several corrosion fighting features are announced for VPI-250. It doesn't require direct application to the surfaces it protects—if the powder is dropped into an enclosed space, its vapors penetrate hard-to-reach areas and condense on all surfaces. And the crystalline film of VPI-250 does not have to be removed from equipment before placing it in operation. Also, only small quantities are needed for protection in shipment or storage. Small items, such as tools, can be removed from a protected atmosphere, used, and then replaced without other rust-preventive measures. Shell Oil Co.

26—DRUM CLEANER is airless abrasive blast unit

For reconditioning cleaning of 30- and 55-gal steel drums before painting and coating, this unit handles the type used for holding chemicals, foods, gasoline, grease, paint etc. It cleans exterior and interior surfaces of open-end drums, together with the lids. It has a hydraulically-rotated table, partitioned so that



there are two compartments or work stations. Each of these consists of two power driven spinner shafts that rotate one drum in the blast zone, and each has a fixture for holding lids in the blast. This arrangement lets one station be loaded and unloaded while the other is in the blast zone.

Cleaning is done by abrasive hurled centrifugally by a wheel in the rear wall of the cabinet, and the spinner shafts are pivoted to enable positioning of the drum, so that either open or closed end drums can be hit at the proper angle by the abrasive. Push button starting and stopping controls are provided. The same abrasive can be used over. American Wheelabrator & Equipment Corp.

27—IMPINGEMENT FILTER for fumes, dust and smoke

In the Dorfan Impingo Filter control of fumes, dust and smoke is accomplished by a moving granule principle. This unit is adaptable to the air and fume systems of new or existing plants, says manufacturer, and it can also be used for by-product recovery. In it, gases are passed horizontally through two or more

Black & Decker
Cases for Comment

CONSTRUCTION

(Case History 4881)
Workers on heavy construction project report B&D Portable Electric Grinders... stand up very well, very handy to use, not awkward nor heavy, give no vibration.

MAINTENANCE

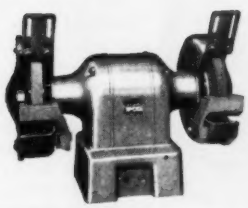
(Case History 2117)
B&D Bench Grinders often give more than 10 years constant use...not losing a minute for repairs.

PRODUCTION

(Case History 4092)
This B&D Die Grinder cuts grinding time ⅓ ...does twice the work.

The McDonald Company of Boston, Mass. manufactures galvanized iron and stainless steel equipment. B&D Tools used for approx. 8 years. In addition to Die Grinder they use B&D Shears, Holguns* and Portable Electric Grinders. The Black & Decker Die Grinders have cut the job time by at least ⅓. Company reports amount of work doubled.

Joe, plant management says that B+D Tools "can take it"
Top management says, "could use more of them"



BENCH GRINDERS
Heavy-Duty models available in 3 sizes, 6", 8", 10". For the finest tool dressing, grinding, wire brushing, burnishing, buffing.

PORTABLE ELECTRIC GRINDERS
In 3 models, 3", 5", 6". All with husky housings and precision parts. Ideal for any job where grinder must be taken to the work.

DIE GRINDERS
2 models. The No. 8 is powered by a new B&D-built motor. Small, only 2½ lbs. ... compact, diameter only 2⅛". Also available, 3" Die Grinder.

Here's Proof that Black & Decker Power Saves *Time and Trouble*

In countless cases where industry needs power, industry's choice is Black & Decker.

In grinders, drills, saws, hammers, screw drivers, industry finds Black & Decker packs the power to get greater production ... per machine ... per man-hour.

Why? Because Black & Decker Power is *custom-built* into every B&D Tool ... power to perform the job the tool is specially designed to do. B&D Tools are driven by B&D-built motors. Built with precision parts and husky housings (in the most advanced designs) every B&D Portable Electric Tool can be relied upon to give long service with less trouble. Every one is a profit-making production tool. And the facts prove it.

Find out for yourself. Next time the job calls for power, call on Black & Decker to supply it. Call your B&D Distributor for a demonstration. And write for free detailed catalog. Address: THE BLACK & DECKER MFG. CO., 611 Pennsylvania Ave., Towson 4, Md.

See "TOOLS-ELECTRIC"

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker
PORTABLE ELECTRIC TOOLS

* Trade Mark Reg. U. S. Pat. Off.

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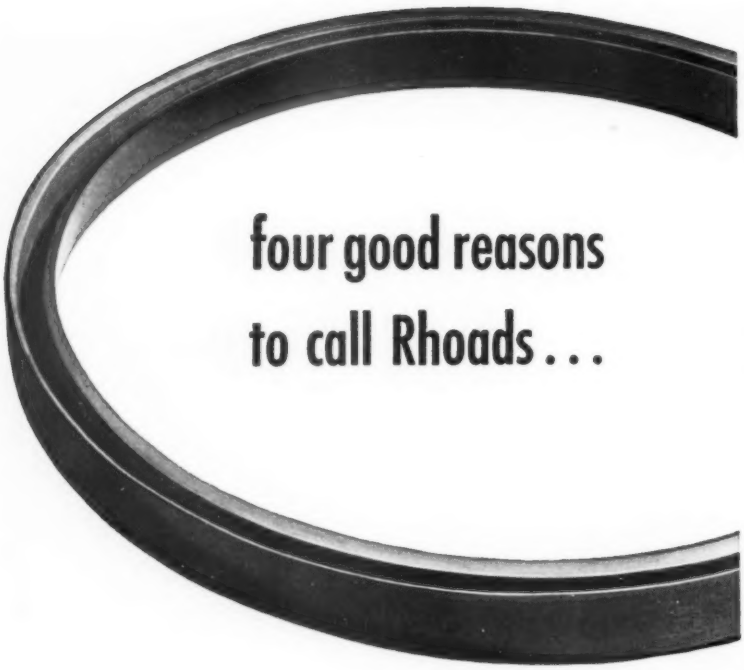


four good reasons
to call Rhoads . . .

when you need leather packings*

1. **They're job engineered from start to finish** by Rhoads engineers. Rhoads Tannate Leather Packings provide an effective seal against glycerin, alcohol, mineral, fish and animal oils . . . water, vegetable or any other non-caustic, non-acid fluid. They will not cold flow and will not score or abrade the most highly finished surface.

2. **They're made from specially tanned leather** to give them a low coefficient of friction, and build up desirable product characteristics to meet your exact requirements.

3. **They're custom impregnated** for operation ranging from a few ounces pressure to many thousands of pounds psi. Tannate packings can be made rock hard or flexible to meet your requirements.

4. **They're precision molded and accurately finished** to fit snug against shafts and cylinder walls. The exacting dimensions to which Tannate packings are manufactured insures a leak-proof seal.

* Available as U, Vee Cup and Flange leathers for hydraulic and pneumatic equipment.

RHOADS
INDUSTRIAL LEATHERS

PHILADELPHIA • NEW YORK • CHICAGO • ATLANTA

For more facts circle 587 on Reply Card

NEW PRODUCTS

(Begins on page 126)

cells containing moving granules—these cells being arranged in parallel or in series, and the rate of flow in each cell controlled by a rotary discharge valve.

As the gases pass through the cells, solid matter impinges against the granules and adheres. Clean gases then pass through labyrinths in the granules to the exhaust system beyond the cells. Dorfan Impingo Filters may have any number of cells and design is flexible that a series of cells may contain more than one size or kind of granule, each to serve a specific purpose—such as moisture absorption, dust removal or chemical composition change. Mechanical Industries, Inc.

28—HOISTING DEVICE elevates parts inside drums

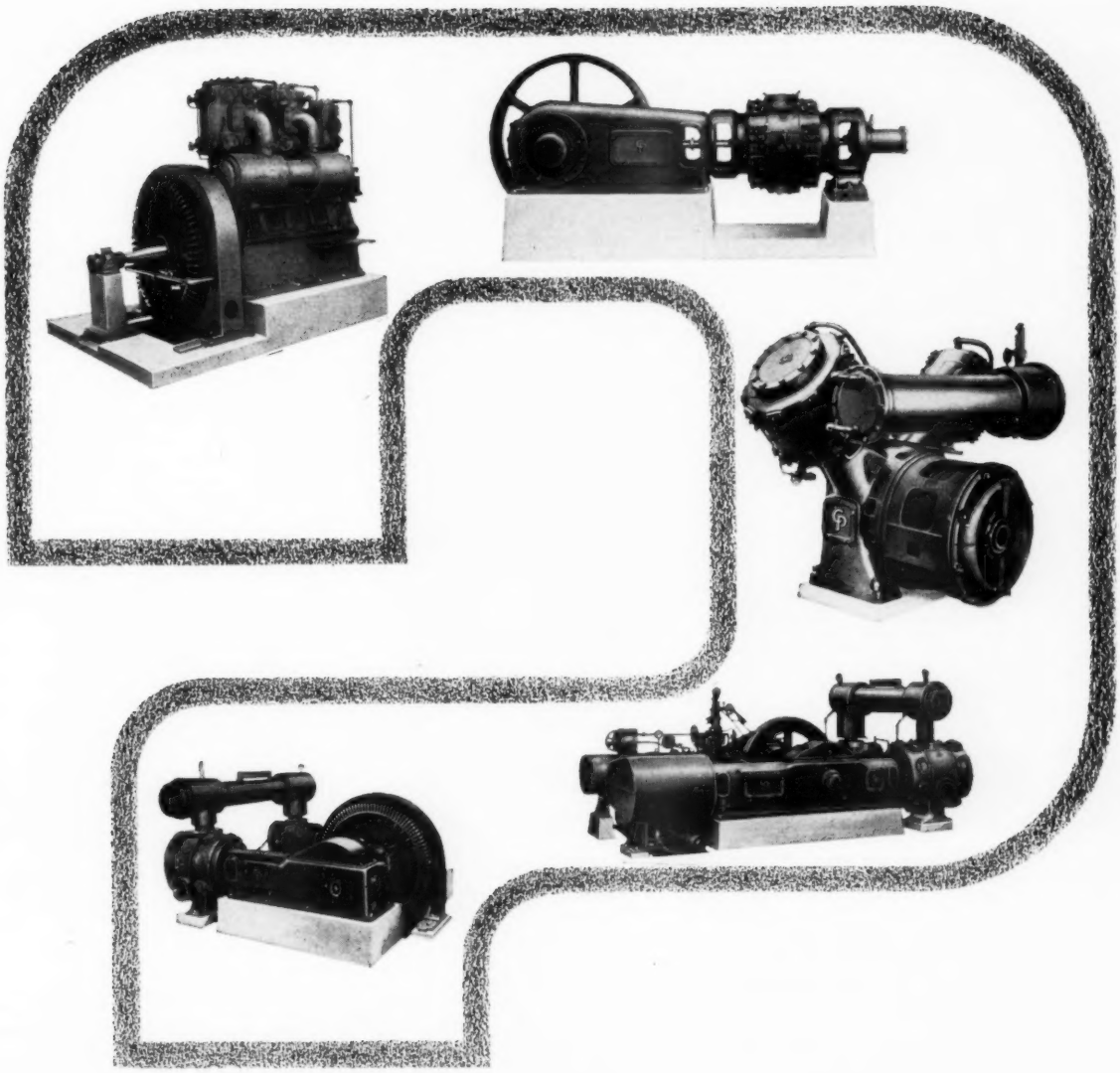
An inexpensive device for raising parts in storage drums to efficient work height, the Drumvator is contained within the drum itself. It consists of two separate assemblies—hoisting frame and the stem and platform assembly. The latter unit is dropped into the drum. Then the drum, above the platform is filled with the parts, with or without the hoisting frame in place. When the drum is filled, the hoisting frame can be slipped over the stem to be in position to raise the parts. The device is operated by moving the hand lever on the hoisting frame.

The standard Drumvator has a 2000 lb lifting capacity; it fits a standard 55-gal drum. A thin sheet metal liner is available to prevent some parts from jamming in ribbed style drums. Complete unit, including both hoisting frame and stem and platform assembly, costs under $27.00. Actron Engineering Co.

29—RUPTURE DISK is made of impervious graphite

The Impervite Rupture Disk has been designed as an easily replaceable, expendable pressure relief device for protecting closed vessels and systems carrying highly corrosive fluids and gases. It is declared especially suitable for applications in the chemical, pharmaceutical and petroleum processing industries. The complete disk is machined to 0.002 tolerance from a solid piece of Impervite imperious graphite, claimed to be immune to corrosive effects of most chemicals, to feature absolute zero porosity, and not to contaminate substances in process.

Designed to withstand temperatures to 325 F, these rupture disks utilize the entire inside diameter of the vent line for the actual pressure relief membrane. This



WHAT DO YOU WANT IN A COMPRESSOR?

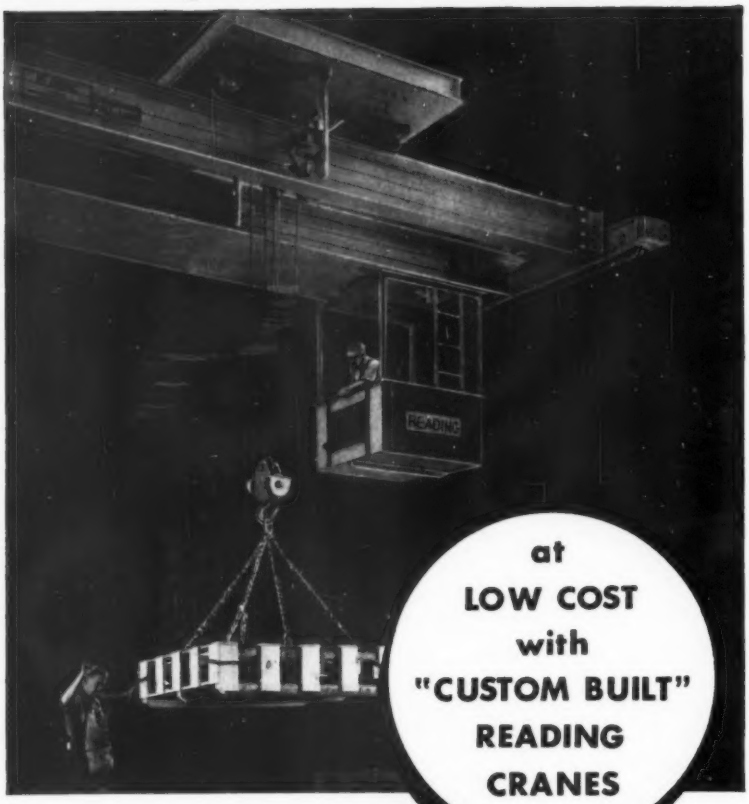
Whatever your requirements, there's a CP Compressor to fulfill your air needs at minimum operating and maintenance costs. Whether the type is portable or stationary . . . single-stage or multi-stage . . . lubricated or oil-less cylinder . . . vertical or horizontal . . . air-cooled or water-cooled . . . for air or gas compression, you can select from Chicago Pneumatic's wide line of compressors. Capacities range from 60 to 10,000 cfm., 7½ to 2000 hp. For complete information on the type compressor you have in mind, write *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

For more facts circle 588 on Reply Card

How to speed Materials Handling...



This crane was engineered to the needs of the job —span, lift, crane drive, trolley drive, hoisting speed —from *standard* READING CRANE units *at no extra cost!*

• How often have you wanted a crane that would . . . cost less . . . speed materials handling . . . reduce maintenance costs . . . and meet all the requirements of your job?

When a READING CRANE is installed in your plant, you get a crane CUSTOM BUILT to fit your operations—at no added engineering cost. This unique UNIT DESIGN offers you a choice of several interchangeable motor, trolley and hoisting units. You reduce maintenance dollars because any unit can be removed for repair without dismantling other units. You buy no "extras" for special handling jobs; your READING CRANE is "tailor made" to your specifications.

For the kind of handling results you're looking for, get in touch with READING right away. At no obligation, one of our engineers will gladly analyze your operations and give you a practical, money-saving recommendation.

Reading Crane & Hoist Corporation, 2103 Adams St., Reading, Pa.

READING CRANES

CHAIN HOISTS · OVERHEAD TRAVELING CRANES · ELECTRIC HOISTS

For more facts circle 589 on Reply Card

NEW PRODUCTS

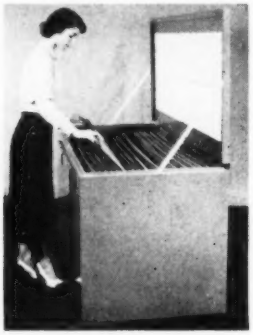
(Begins on page 126)

feature, combined with the non-ductile characteristic inherent in Impervite, is said to permit practically complete break-out of pressure membrane to allow maximum full opening for safe escape of excess pressure.

The disks fit standard 150 lb flanges, and are intended to be used between vessel nozzle and vent line. They are available for pressures from vacuum to 75 psi, in nozzle diameters from 2 to 24 in. Falls Industries, Inc.

30—PORTABLE CABINET for vertical filing of plans

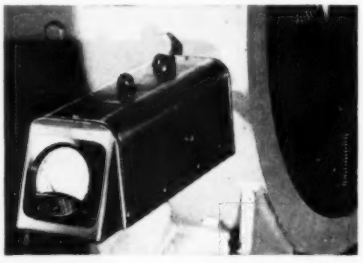
A time-and-space saving device for holding plans, drawings and blue-prints and sketches, the Planfile is a portable cabinet allowing for the vertical filing of



3000 to 5000 separate sheets—the equivalent of 30 average plan drawers. Special features are spring compressors that hold the drawings in a smooth, "ironed out" position; a counterbalanced cover for one-hand operation while opening and closing; and a visible index that is automatically exposed when the cover is raised. Art Metal Construction Co.

31—VIBRATION METER is direct reading, portable

A new direct reading portable vibration meter, Type VHA, is offered for measuring both displacement and acceleration. It measures over a frequency range of



10-250 cps, acceleration ranges of 0-0.03, 0-0.1, 0-0.3, 0-1, 0-3, 0-3, 0-10 g, and peak to peak displacement ranges of 0-3, 0-10, 0-30, 0-100 and 0-300 mils full scale.

The meter consists principally of a barium titanate accelerometer, which feeds

FROM THE HORN OF PLENTY AT BONNEY FORGE

WELDOLETS and THREDOLETS for Stainless and Alloy Piping

STAINLESS
F 304 304 ELC F 316 F 347

CHROME MOLY
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MONEL

WROUGHT IRON

ALUMINUM

AND OTHER ALLOYS

When constructing with alloy, you're investing *real money*. Assure performance-proved fittings and save dollars by specifying and using Weldolets and Thredolets for 90° branch joints—large and small, full size and reducing.

Distributors in Principal Cities

WELDING FITTINGS DIVISION
BONNEY FORGE & TOOL WORKS
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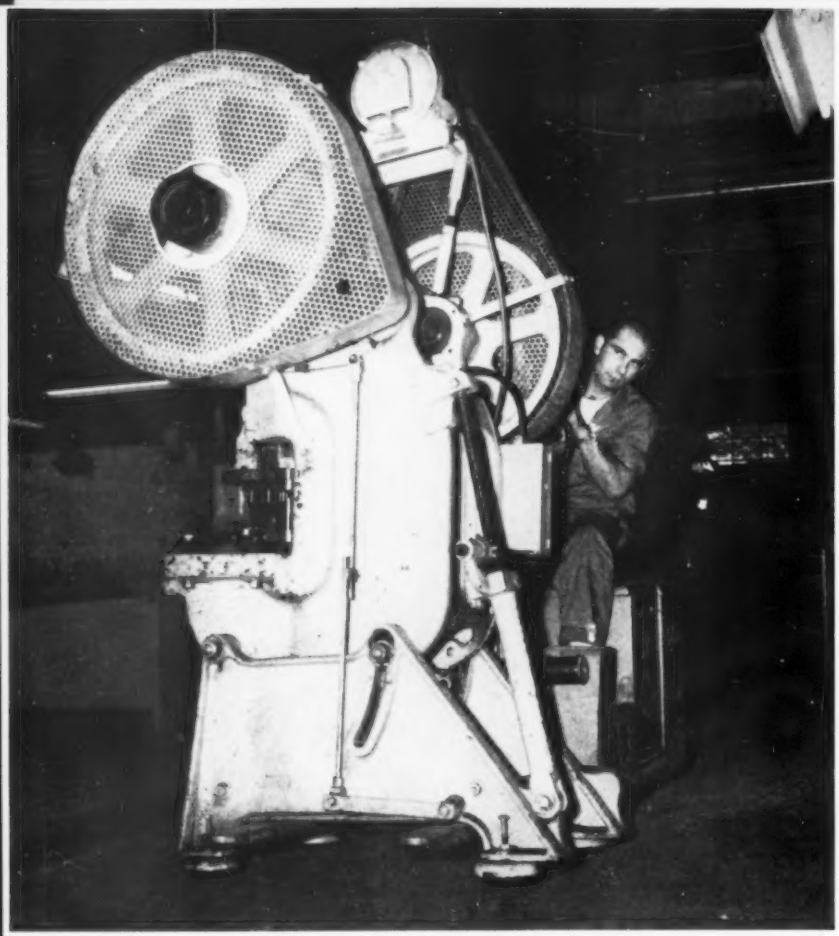
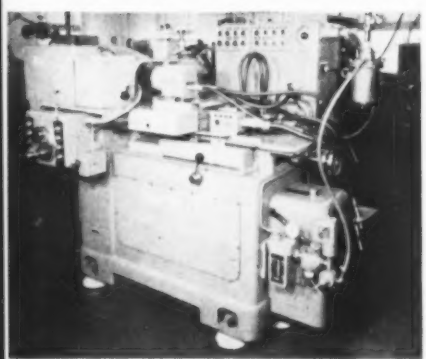
ALLENTOWN, PENNSYLVANIA

For more facts circle 590 on Reply Card



NO LAGGING MADE THIS PRESS "MOBILE." This 45-ton Perkins punch press was moved 200 feet — and was out of production only 5 minutes, because it was on Leveling Barrymounts.

MACHINERY THAT MOVES WITH THE TIMES CUTS COSTS



GRINDER ACCURACY PROTECTED. Leveling Barrymounts protect this Heald Size-Matic from external shock while grinding the inner races of miniature precision ball-bearings to within tenths of thousandths of an inch.

Your product costs can be cut because mobile machinery offers you flexible production layouts. Machine maintenance and reject costs are cut because damaging external shocks are isolated. Installation costs are cut because requirements for certain foundations are eliminated—no lag bolts to set or shims to drive, yet machines will not walk.

Write *today* for the story of MACHINES THAT MOVE WITH THE TIMES

THE BARRY CORP.

910 PLEASANT STREET
WATERTOWN 72, MASS.

SALES REPRESENTATIVES IN ALL PRINCIPAL CITIES

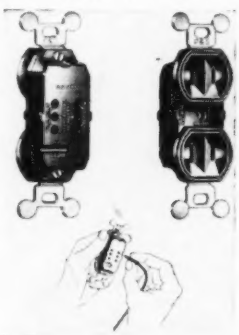
NEW PRODUCTS

(Begins on page 126)

through an electronic amplifier and a copper-oxide rectifier to an indicating microammeter. Operation is not affected by magnetic fields, it is pointed out. Operating on common hearing aid batteries, the battery voltage and calibration can be easily checked by an adjustment of the selector switches on top of the instrument. The Type VHA weighs about 5 lb. It is equipped with a pistol grip, trigger-type switch. The General Electric Co.

32—DUPLEX OUTLET has easy-to-wire terminals

Easily-wired screwless terminals and double-grip contacts are features of the new P&S 1500 Duplex Outlet. It can be wired quickly in two easy steps: (1) strip wire to gage (molded in back of

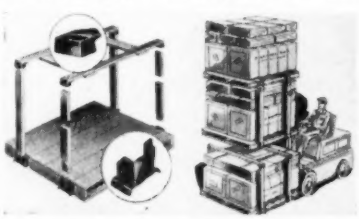


outlet); and (2) insert wires in wire holes. Phosphor bronze spring contacts hold the wires securely.

When necessary, wires can be removed by inserting an 8-penny nail or other pointed instrument in center hole on either side, it is noted. Double torsional contacts are of phosphor bronze and designed to give a "long line" contact with a minimum amount of heat. The back is insulated. Pass & Seymour, Inc.

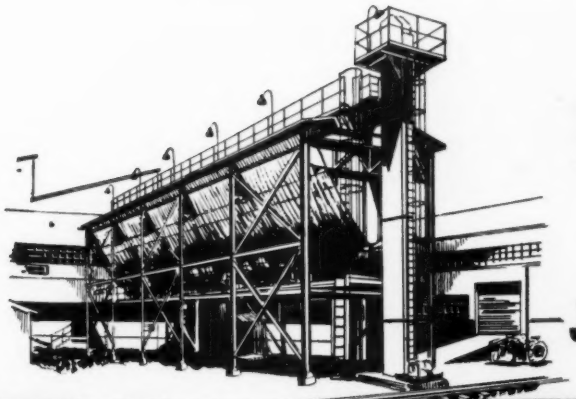
33—HARDWARE lets plant build its stacking pallets

V-socket type hardware for building stacking pallets is announced as safe, flexible and inexpensive. It assembles to standard pallets. Each pallet with this



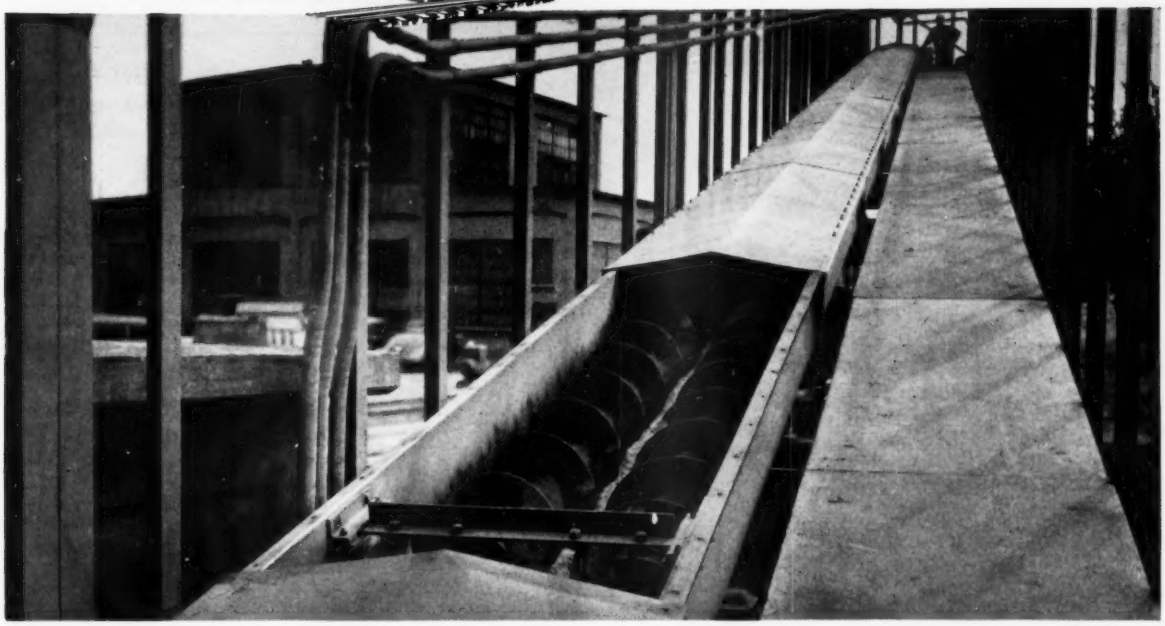
hardware and 2x4 in. uprights is designed to carry 1500 lb in a tier of three high, or a total of 4500 lb with 48-in. posts. Additional load capacity can be attained by using 3 by 4's. Uprights and cross boards are beveled for easy assembly. The manufacturer offers: cast semi-

← For more facts circle 591 on Reply Card



VERSATILE...

is the word for JEFFREY standard units



Line drawing: Jeffrey Standard Bucket Elevator feeding storage bin.

Photo: Jeffrey Twin-Spiral Conveyor System handling finished cement from mill to railroad cars for bulk snipment.

OTHER JEFFREY STANDARD UNITS
BELT CONVEYORS
APRON CONVEYORS
SCRAPER CONVEYORS
POWER SCOOPS

Jeffrey Standard Spiral Conveyors and Bucket Elevators are available in a range of types and sizes that meet practically every industrial requirement and operating condition.

Each Spiral Conveyor is completely assembled in our plant to assure perfect fit and alignment. Before dismantling for shipment, parts are match-marked to facilitate field erection.

Split-head Sections are available on Jeffrey Standard Bucket Elevators. New High-Front Buckets on continuous types increase the versatility of the line.

WRITE FOR CATALOGS CONTAINING COMPLETE INFORMATION.

THE JEFFREY MANUFACTURING CO.
ESTABLISHED 1877
Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED
. . .IT'S A JOB FOR JEFFREY!

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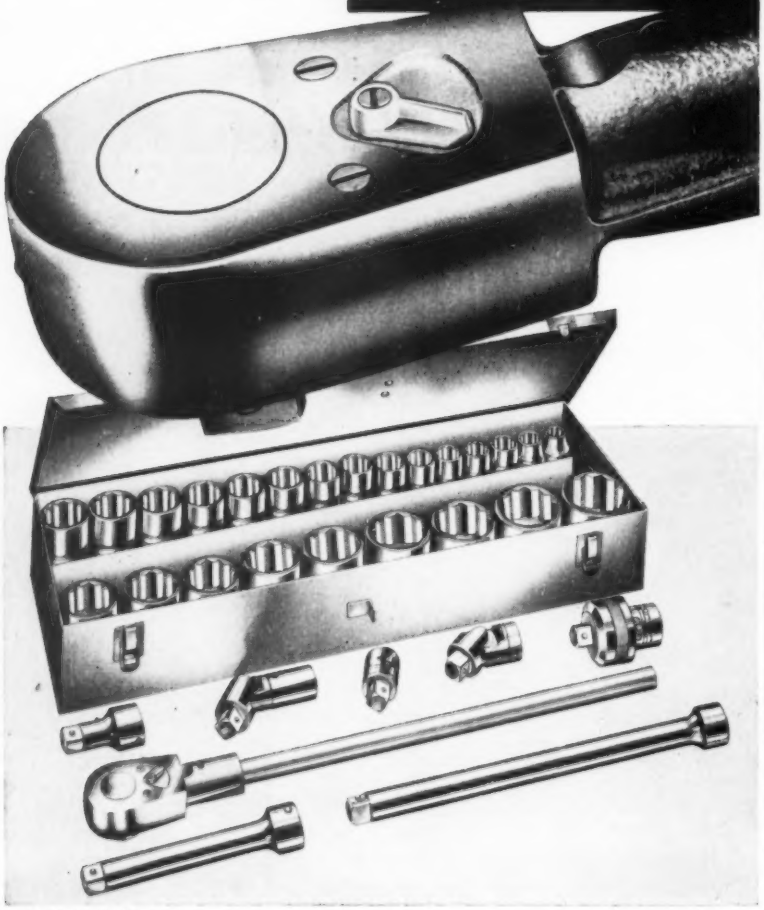
Snap-on*

HEAVY DUTY LOXOCKETS



SET 432-HD-B

POWER FOR THE TOUGH JOBS! This is the wrench set to have at hand for the jobs that require size and power and sweeping leverage. These tools give *speed* as well—the big handles, adaptors and sockets are sleekly proportioned, versatile and fast working. The more powerful the wrench, the more you want *safety*—and Snap-on provides it—with positive button locking of units to give the security of a one-piece tool. The Loxocket release pin gives fast interchangeability of units. Available through your nearby Snap-on factory branch. For Snap-on industrial catalog, and 104-page general catalog of 4000 hand and bench tools, write

SNAP-ON TOOLS CORPORATION
8068-H 28th Avenue
KENOSHA, WISCONSIN
*Snap-on is the Trademark of Snap-on Tools Corporation.

For more facts circle 593 on Reply Card

NEW PRODUCTS

(Begins on page 126)

steel hardware only; hardware plus uprights and cross-bars; and complete stacking assembly plus pallets. It is pointed out that this hardware is adaptable to shelving, bins, and knock-down boxes. The Paltier Corp.

To receive product data circle item number on the handy Reader Service Cards provided on pages 157-158.

34—20-AMP TROLLEYS for busway electric systems

Four new 20-amp special service trolleys are offered for this company's "60" trolley busway electrification systems in which service is continuous or where capacity higher than provided by standard "60" trolley is necessary. The extra capacity afforded by these trolleys is declared particularly advantageous in budget hoists, low tonnage cranes, portable and machine tools where motors up to 3 hp can now be powered without trolley overload. Feedrail Corp.

35—ELECTRONIC TESTER checks aircraft instruments

An electronic jet engine tester, the Jetcal, checks the "honesty" of some critical instruments in a jet plane's cockpit—the engine's tail cone heat indicators (thermocouples), the fire warning systems and

wing anti-ice systems (thermoswitches). And although designed for aircraft, it is expected to find application in other industries using critical temperatures.

The Jetcal performs a functional test of the exhaust gas temperature thermocouple circuit measuring system of a jet engine without running the engine or disconnecting any wiring, it is noted. As a "pre-trouble" shooter, it is designed to isolate errors in the exhaust gas temperature system; check thermocouples for continuity, to "tab" the tail opening of the jet engine and give temperature readings for checking the setting of fuel control or automatic nozzle on openings; to check the thermocouple harness ring in the jet engine before its installation. B & H Instrument Co., Inc.

Air view of Nabisco's new Chicago bakery indicates its unusual architectural conception as well as its huge size.

B&W Integral-Furnace Boilers, Type FM, in service at Nabisco. Delivered completely shop-assembled, FMs are ready to skid or lift into position, connect to services, and place in operation.

keeping steam cheap . . .

World's Largest Bakery

served by 3 B&W *Integral-Furnace Boilers, Type FM*

Typical of the increasing demand for the B&W Type FM Boiler was the choice of a multiple-unit installation for the largest, most modern bakery in the world, capable of producing 167 million pounds of baked goods annually. Occupying 12 acres of a 45-acre site, National Biscuit Company's new Chicago bakery is an outstanding example of scientific application of straight-line mass production methods combined with the highest standards of cleanliness and sanitation, and striking architectural beauty.

Since January 1952, the three FM units have been generating steam for heat, hot water, and various processing operations, such as melting shortening for easier unloading from tank cars and to facilitate its distribution within the plant.

Designed to produce 25,000 lb of steam per hr each at 110 psi pressure, the B&W Units are oil-fired—make a positive contribution to the elimination of smoke and fly ash required by Nabisco. Choice of the three FM boilers rather than a single, larger unit resulted after careful consideration of all factors and a realization that the FM unit offers the benefits of "package" steam combined with many cost-saving big-boiler advantages.

COST-SAVING FEATURES of the B&W Type FM Boiler

- Saves Erection Time and Cost
- Meets Wide Range of Service
- Handles Quick Load Changes
- Fast Steaming
- Low Maintenance
- Easy Accessibility
- Suitable for Outdoor Service
- Burns Oil and/or Gas
- Saves Fuel
- Saves Space
- Safe, Automatic Operation

Satisfaction with the performance of the B&W Type FM Boiler is proved by the number of units in service and on order for industries, utilities, and other users in practically every category. In terms of total steam capacity they add up to about 9,000,000 lb per hr, and better than half of this capacity is in multiple-unit installations. The compact, shop-assembled FM is available in standard sizes for loads ranging from 2900 to 36,000 lb per hr at steam pressures to 235 psi—is also available for higher pressures.

Bulletin G-76A describes in detail the many cost-saving features of this self-contained, popular small boiler. Write for your copy. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd St., New York 17, N. Y.

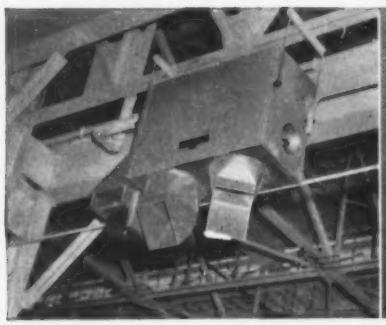
G-642

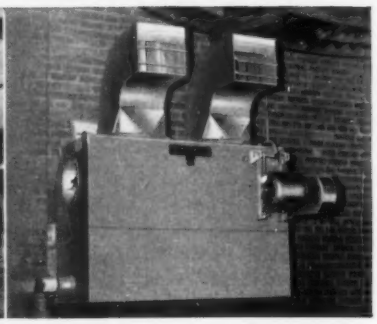
BABCOCK & WILCOX BOILER DIVISION

For more facts circle 594 on Reply Card

HEAT-VENTILATE

YOUR PLANT WITH THESE SPACE-SAVER "BUFFALO UNITS"



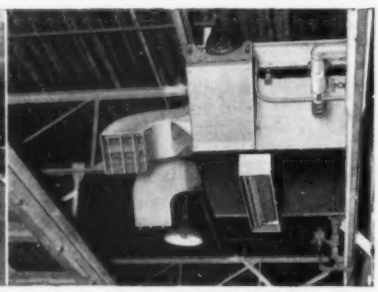


NO FLOOR SPACE REQUIRED

with a "Buffalo" Suspended Lowboy Unit Heater. Easily mounted in roof trusses. Spreads abundant, low-cost heat where you need it. Provides ventilation in warm weather.

FRESH, CLEAN WARM AIR

(or cool outside air) is delivered by a compact "Buffalo" Highboy Unit with fresh air filtered intake thru side wall. Bearing bowl at left permits easy external lubrication.



LOW OVERHEAD — HIGH EFFICIENCY!

Wall-mounted Lowboys provide plenty of heat even where quarters are cramped. New coil design increases heating surface, with narrower coil section. Coils are non-freeze.

SWIVEL OUTLETS "AIM" FLOW

accurately—a "Buffalo" efficiency feature. Others are "Buffalo" mixed-flow fans with unusually stable performance — standardized parts — lifetime construction.

Let us show you NOW how low-cost and easy it is

to heat and ventilate your plant. Bulletin 3704-A gives all details on the units to handle your heating — ventilating — makeup air problem

Handy chart gives you air diffusion distances for each unit and capacity up to 35,000 cfm.

"Buffalo"

WRITE FOR BULLETIN 3704-A TODAY!

BUFFALO FORGE COMPANY

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PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

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PRESSURE BLOWING · COOLING · HEATING · FORCED DRAFT · VENTILATING
AIR CLEANING · AIR TEMPERING · INDUCED DRAFT · EXHAUSTING

For more facts circle 595 on Reply Card

Accumulators Rate High

(Continued from page 95)

to reverse the motion of the table was met by a force created by the weight of the table moving in the opposite direction. The result was an instantaneous shock load back through the main selector valve. Placed between the manually controlled selector valve and the main selector valve, the accumulator successfully absorbed the shock.

The duplicating lathe shown in Fig. 6 is required to turn out products with various leads and rises automatically. Machine set-up had to be simple and fast. Hydraulic operation was selected for contour control mechanism because infinitely variable speed control was desirable for the tool table drive.

Figure 5 illustrates the simple hydraulic schematic and shows that portion of the system in which the hydraulic accumulator was placed. Movement of the tracer must accurately follow a master former and this control is accomplished by a follower circuit. Movement of the cylinder is controlled by a transfer valve connected to the rod end of the cylinder and the volume of the pump connected to the head end. This pump pressure is also directed to the pressure port of the transfer valve. Oil at a constant pressure determined by the unloading valve setting is supplied to the head end by the control sources supplied to the rod end of the tracer valve. The unbalancing of volumes created through the tracer spool movement causes the head to move, effecting accurate machining.

Movements of tiny increments of an inch are accomplished. The power system with reference to the hydraulic system, was originally constructed with a 15 gal tank on which a pump and motor relief valve combination was mounted. During work operations, the relief valve would relieve causing excessive build up of heat.

The problem was solved by introducing a hydro-pneumatic accumulator in conjunction with an unloading valve and check valve.

Another important function of this accumulator is its use as an emergency source of power. In plants which have overloaded electrical systems, a power failure can result in the destruction of an important piece of work. A complete power failure cuts off the source of hydraulic power causing the tool to gouge the work piece. The accumulator provides enough power to prevent this from happening simply by providing fluid to the hydraulic tracer unit and reversing the cutting tool cylinder.

The broaching machine hydraulic circuit, Fig. 7, helps to bring out

(Turn page)

important news on roof maintenance

NEW *GLASFAB* METHOD CUTS COST OF ROOF RESURFACING, ASSURES BETTER RESULTS

You can cut roof maintenance costs . . . and get longer-lasting protection against damaging leaks by using Glasfab, the fiber glass roofing membrane.

Preferred by architects and contractors since its introduction in 1947, Glasfab is the performance-tested answer for repairing or resurfacing industrial plant roofs.

Glasfab does what a membrane is supposed to do—it provides a virtually indestructible reinforcement for roofing compounds. Glasfab is much stronger than cotton, felt or other *organic* fabrics . . . and unlike these conventional membranes, can't rot, decay, char, burn or become brittle. Glasfab produces a flexible roof surface five times as tough as with felt, thus stays water-tight under damaging roof traffic.

Glasfab cuts roof maintenance costs three ways: (1) Glasfab costs less than most inferior organic membranes, (2) Glasfab reduces installation labor costs up to 50% and (3) Glasfab guarantees a lower *lifetime* cost with fewer repairs or replacements due to membrane failure.

Your own maintenance crew or your roofing contractor can install Glasfab. It comes in light, easy-to-handle rolls that weigh only 17 pounds, cover 1150 sq. ft. Smaller rolls are available for small jobs. And applying it with cold coatings (either emulsion or cut-back asphalt) is simple and fool-proof.

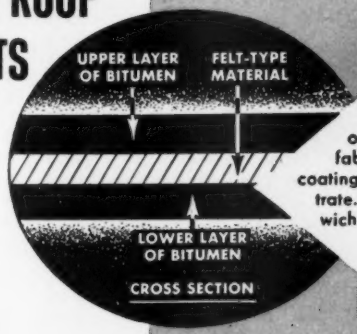
Whatever your topside repair problem—flashings, copings, parapets, or the roof surface itself—you will get better results at less cost with Glasfab . . . it's "*tops for topside protection*".

TWINSBURG-MILLER CORPORATION
P. O. BOX 207 • TWINSBURG, OHIO

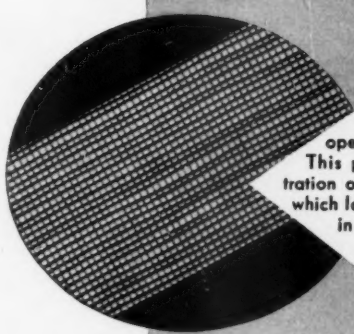
THE MODERN FIBER GLASS ROOFING MEMBRANE

GLASFAB
Tops for Topside Protection

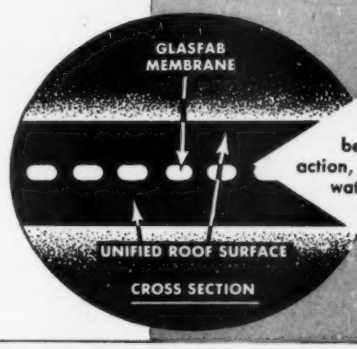
GLASFAB'S "BUILT-IN HOLES" KEEP ROOFS WATER-TIGHT LONGER!



Old-style membranes are felt-type or tightly woven fabrics which roof coatings cannot penetrate. Result: "sandwich-type" surfaces vulnerable to early failure and leakage.



BUT —look at Glasfab's open-mesh weave. This permits penetration of roof coating, which locks membrane in unified surface and bonds tightly to old roof.



Glasfab's "built-in holes" assure better reinforcing action, thus produce a waterproof surface with greater strength and longer life.

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Twinsburg, Ohio

☐ Please send sample of Glasfab.
☐ Please send folder showing where Glasfab cuts costs.

Name:_____ Title:_____
Company:_____
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City:_____ State:_____

For more facts circle 596 on Reply Card

J&L STEEL

JAL-TREAD

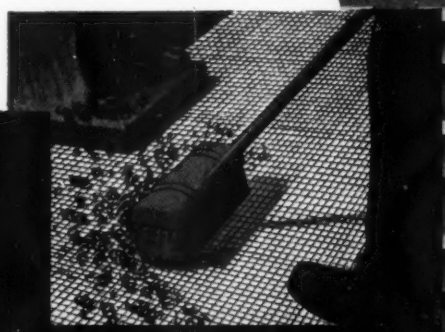
for safe permanent flooring

Jal-Tread floor plate combines the strength and durability of high quality steel in an exclusive checkerboard pattern scientifically designed for *safety*.

Whatever your application . . . in new construction . . . new equipment . . . or replacement jobs, Jal-Tread will assure you of these advantages:

SAFE FOOTING—300 miniature squares per square foot—all of uniform height—provide maximum linear friction surface that protects you against lost time accidents.

EASY FABRICATION—Jal-Tread's straight line pattern simplifies welding, flanging, shearing, bending, punching, and drilling operations. Experience shows that Jal-Tread can be cold-formed on standard plate bending machines.



EASY CLEANING—Jal-Tread's straight line gutter pattern permits quick, thorough sweeping and draining in any direction.

ATTRACTIVE APPEARANCE—Jal-Tread's exclusive checkerboard pattern gives a distinctive, neat appearance in all its applications.

For safe, long-lasting flooring, specify J&L Jal-Tread . . . the only true checkerboard floor plate.

Available at leading distributors everywhere

Jones & Laughlin

STEEL CORPORATION — *Pittsburgh*

J&L STEEL

another function of the accumulator. Briefly, an explanation of the hydraulic power circuit is as follows. Power from the pump develops 3000 psi by blocking the relief valve vent. This system pressure is required for the expanding operation. When connected to a second relief valve, clamping pressures of 800 psi will be developed. Unclamping pressures of 60 psi are obtained by venting through a high cracking check valve to the tank. This low pressure is used to unload the pump during idling periods and prevent the build up of heat.

Oil is directed to a pair of fixture cylinders by a modified closed center four-way valve. The purpose of modifying this valve is to obviate effects of piston seal leakage. Clamping pressure on the work piece is provided by means of forward fixture cylinders. Protection from high pressure oil is effected by a spring offset three-way valve.

A surge dampening valve is required in the rod end supply line of each fixture since large volumes of oil at moderately high pressures are involved. All flow control valves are directly operated by solenoids.

The main function of the accumulator in this application is to maintain line pressures on the fixture cylinders.

How about LP-Gas?

(Continued from page 89)

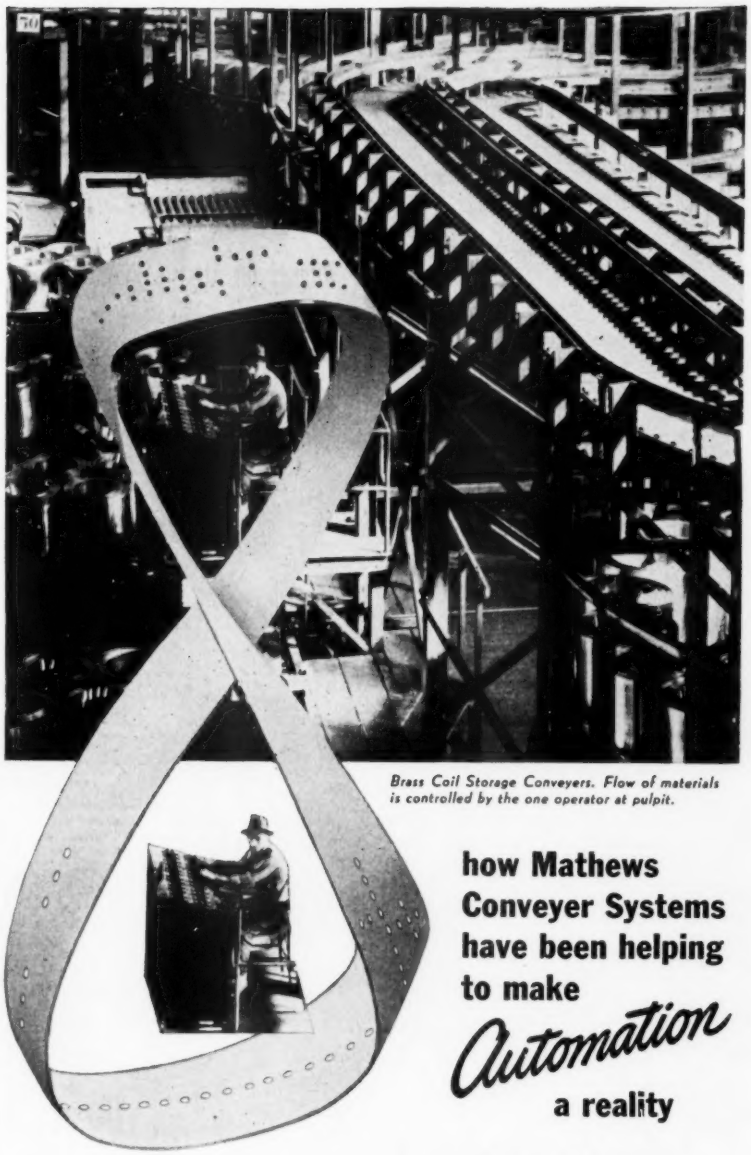
Usually the regulator-to-carburetor hose is connected to a spud-in either in the gasoline carburetor or via a special carburetor.

Between filter unit and regulator there is an optional electrically- actuated lock-off valve. This hooks to an LPG "on-off" switch near the truck operator's usual engine controls. "Off" —and the lift can run on gasoline, with butane "locked-off" by the solenoid valve. "On" and the butane valve opens while the gasoline supply is valved off—either manually or electrically.

Ordinarily, a fork-lift operating the usual 8-hr shift will use one tank of butane (5 gal) per shift. However, fuel-cost savings are insignificant compared to lowered maintenance costs and to reduction or elimination of irritating fumes.

Plant maintenance men who've tried the conversions say maintenance savings are enough to entice others to try a switch-over.

As a Los Angeles area maintenance foreman says, "Once you've put your fork-lifts on LPG, you'll keep them burning the stuff. We've got our 8 trucks burning butane and we'd never go back to gasoline. Matter of fact, employees would squawk if we tried."



Brass Coil Storage Conveyers. Flow of materials is controlled by the one operator at pulpit.

how Mathews Conveyer Systems have been helping to make *Automation* a reality

● Mathews Conveyers, equipped with such control devices as electric eye mechanisms, traffic control units, special brakes and stops, and automatic deflectors, have for several years been helping manufacturers to progress toward automation by handling materials to processing machines and away with a minimum of manual effort. In almost every industry, in plants throughout the United States and Canada, you'll find Mathews Conveyer Systems at work helping to make AUTOMATION a reality. Write for informtaion to the Mathews Field Office or Plant nearest you.

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Industrial Roof Maintenance

PRODUCED IN FULL COLOR, with sound, "Mr. Glasfab Goes Topside" is a 16mm film which tells about industrial roof maintenance.

A study of the problems involved in modern roof maintenance was made by Twinsburg-Miller Corporation, and the results are shown in this film. Repair of blisters, cracks and other roofing damage is shown in its entirety. Step by step instructions for roof resurfacing give a concise understanding of how to cope with and overcome roof damage.

Copies of the motion picture may be borrowed free, except for return postage, from Mr. H. M. Knoerle, Jr., Twinsburg-Miller Corporation, P. O. Box 207, Twinsburg, Ohio.

Report on Atomic Submarine

A READILY UNDERSTANDABLE explanation of the principles of nuclear propulsion is presented in a short motion picture about atomic submarines, "The Atom Goes to Sea."

Operation of the propulsion system, some of the engineering problems encountered and the reasons that submarines were the first naval vessels to which atomic power was applied are shown and explained in animation.

In production for 18 months, the film also shows live scenes at an atomic power laboratory and at a reactor site.

Prints of the 16mm black and white film will be made available by the General Electric Company, in G-E Apparatus District film libraries for preview showings to company executives. It will become available for general showing on September 1.

Handling Wheels Safely

HOW TO AVOID FOUR major causes of grinding wheel breakage is demonstrated in a new 16mm color film, "Play It Safe." One of the high spots of the film shows in slow motion, a grinding wheel flying apart.

It is expected that this motion picture will aid plant safety in two ways: first to decrease accidents caused specifically by faulty handling of grinding wheels, and second, to promote safety generally.

Prints are available, without obligation, for showing wherever grinding wheels are used, to foundry and safety associations, from Peninsular Grinding Wheel Sales Corporation, Department A, 729 Meldrum, Detroit 7, Mich.

Steel Tubing

AN EDUCATION IN STEEL tube manufacture is given in a new 20-minute long, 16mm sound and motion film, "Steel Tubes for Industry."

Released by Pacific Tube Company of Los Angeles, the film is available free to business organizations, chambers of commerce, etc. Requests should be addressed to the company at 5710 Smithway St., Los Angeles 22, Calif.

Aluminum Skyscraper

FIRST ALUMINUM SKYSCRAPER to be built in this country is the subject of a 28-minute motion picture.

The film describes nearly every phase of construction including the aluminum curtain wall, radiant-heated ceiling, plumbing and wiring.

For the final 10 minutes of the film, the viewer is taken on a tour of the completed building.

Prints of this 16mm, sound film are available to business, educational and civic groups by writing to the Aluminum Company of America, Motion Picture Department, 754 Alcoa Building, Pittsburgh 19, Pa.

Reach For The Cause

The Battle Of Production Costs

The NEW economic battle is a skirmish between ENGINEERING, Production and COSTS. The swing is to AUTOMATION with high speeds and automatic feeding. Mr. Engineer, let us reach for the cause . . . remove DUST AND FUMES . . . which cut down the power of AUTOMATION.

Tooling and production ammunition must be guarded against the elements of dust, fumes and fire. Accumulative dusts prevents efficiency of every press stroke . . . increases production costs . . . creates physical hazards and is one of your GREATEST COSTS. Choose the system that fits the job — by Young & Bertke.

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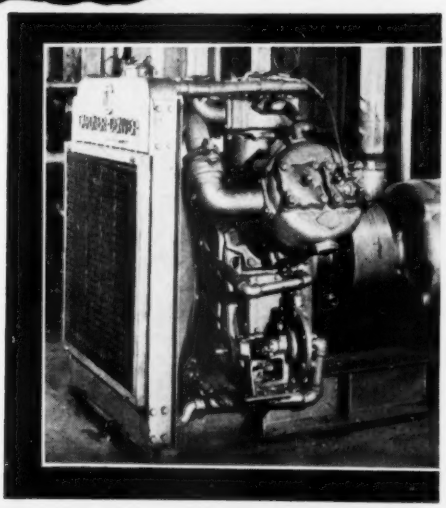
for faster, better maintenance—GARDNER-DENVER!

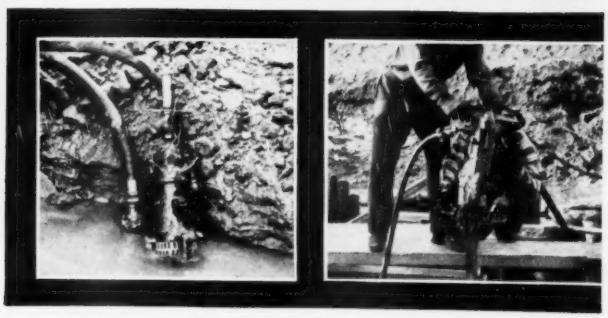
They're using Gardner-Denver Air Tools—powered by the compact and efficient Gardner-Denver WB Compressor that's so easy to install.



demolishing concrete

firming backfill

running conduit



draining pond

driving sheeting

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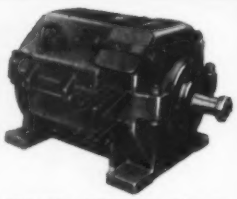
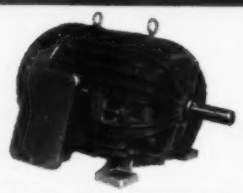
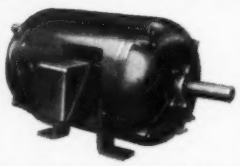
Gearmotor. Available in single, double, or triple reduction with any Crocker-Wheeler Motor in frame sizes from 1 to 150 hp.



Mill motor, W600 series DC, conforms in all respects to AISE standards. Offers more power without an increase in frame size.



Explosion-proof "Sealedpower." Listed by Underwriters Laboratories for Class I Group D, and Class II Group F and G locations. Available in ratings up to 100 hp.

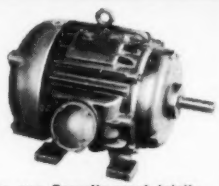


Wound-rotor protected type. For slow, smooth acceleration, high starting torque with low starting current or variable speed. Dripproof, splash-proof, 140-200 hp.

wherever you want it...

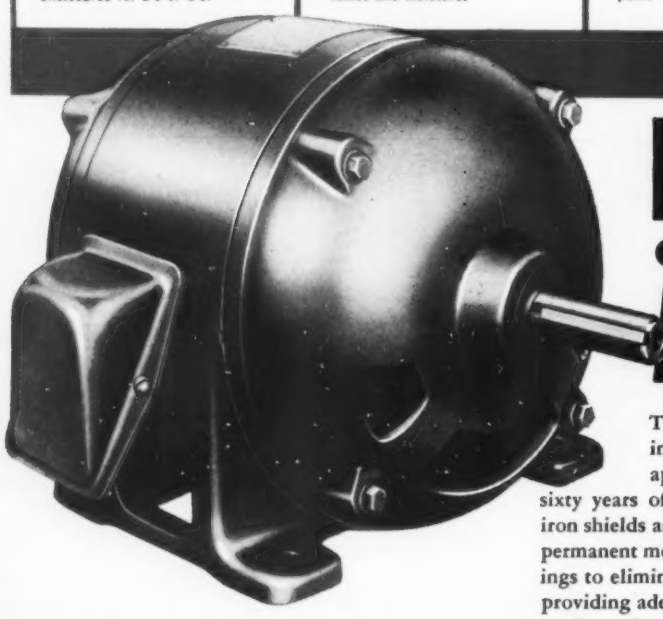
Brake motor using latest disc type brake mounted on dripproof motor. Also available with totally-enclosed and splash-proof enclosures for a-c or d-c.

Squirrel-cage, totally-enclosed, non-ventilated. Available up to and including 3 hp, at 1800 rpm, for protection against dust, fumes and moisture.



The new Taconite-proof totally-enclosed fan-cooled squirrel-cage "Sealedpower." Armed against magnetic dust at every point of possible penetration.

Direct-current open-type (illustrated). Also dripproof guarded. Form F, in ratings to 7½ hp. Form H, in 10 to 200 hp.



Squirrel-cage protected type. An open dripproof motor for general purpose use. Available in wide modifications to meet a variety of conditions.

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There's a rugged, dependable Elliott C-W Motor in this line-up for practically every 1 to 200 hp application in industry. They are backed by over sixty years of proven design and construction. Grey cast-iron shields and frame assure solid support for bearings and permanent motor alignment. Sealed, prelubricated ball bearings to eliminate bearing contamination or corrosion while providing adequate grease for the life of the bearings. These are just a few of the many features that add up to long years of trouble-free service. For details on any of these motors, call your local Elliott Field Engineer or write for the latest bulletin. Address Elliott Company, Crocker-Wheeler Division, Ampere, N. J.

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BULLETINS

(Begins on page 27)

rials handling systems, motor controls, machine tools and plant processes. Illustrates 27 of manufacturer's typical panels. Lists control-panel applications for chemical and food processing operations. Richardson Scale Co.

158 Tracer Control—An all-electric tracer control system providing automatic control of one or more machine motions is described in Bulletin GEA-6122, 6 pp. Explains, through use of diagrams, the operation and components of the basic tracer control and its variations. General Electric Co.

159 Input Controller — Bulletin 654 describes, gives specifications on company's Truetemp input controller which is added to an existing "on-off" temperature control system that is thermocouple actuated, to provide furnace or heating control as close as ±0.2 F. Explains controller is designed to improve heat processing, reduce losses from rejects or off-quality products. The Winslow Co.

160 For Metering Gas Flow—Bulletin 100-L5, 8 pp, describes application of venturi tubes to measure the flow of gas at large volumes or low pressure. Compares operation with comparable orifice plate installation. Includes orifice and venturi tube computations which form the basis for comparisons for venturi vs. orifice head loss. Builders-Providence, Inc.

161 Dynamometer Systems—Bulletin GEA-5923A, a 12-pp revision, tells how company's dynamometer systems can be used for testing internal combustion engines, transmissions, torque converters, rear axle assemblies. Gives data on systems, wide speed and torque range ability to meet many testing and measuring needs. General Electric Co.

162 Valve Actuator—Bulletin 3020, 8 pp, describes plug valve tandem type actuators for valves requiring relatively high torques to operate and floating bar type for valves needing lower operating torques. Shows actuator selection table, typical applications, dimensions and weights, mountings. Ledeen Mfg. Co.

163 Dual Purpose Instrument—Company's new motor rotation and phase tester is described as to application and operation in Bulletin 80. Tells how instrument determines rotation of electric motors before they are connected to line; also phase rotation or sequence of energized power circuits. James G. Biddle Co.

164 Television Equipment — Twenty basic applications for "TV Eye" low-cost closed circuit television equipment are described and pictured in Form 3R2335. Folder explains equipment's functions and operation, lists specifications. Radio Corp. of America.

AIR CONDITIONING AND VENTILATING

165 For Climate Control—Bulletin 122, 8 pp, introduces an air conditioner designed for precise and economical control of air temperature and moisture. Illustrates design of the new machine, tells its features, and pictures some installations. Tells how it may be used in heating and cooling processes, and how it permits processing of moisture-sensitive materials. Niagara Blower Co.

166 Air Conditioners—Ceiling-mounted and floor-mounted central station units for year-around air conditioning are described in Bulletin C-1100-B33B, 8 pp. Gives specifications, dimensions, accessories, physical data; tells advantages of sectional construction for easy handling. Worthington Corp.

167 Heating, Ventilating Equipment—The 36-pp 1954 edition of this company's estimating catalog presents a line of heating, ventilating, refrigeration and air conditioning equipment. Lists blowers, fans, compressors, accessories and fittings, pumps, coils, valves, motors, V-belt drives, grilles, registers and related equipment. Also introduces a line of cooling towers. M. Blazer & Son.

Among this Month's New Literature of Merit . . .

168 Welded Chain—In 16-pp Bulletin B, all types of welded chains are cataloged as to working load limits, material diameter, link sizes, finishes, packaging and other data required to specify chains. Both fire-welded and electric-welded chains made from low carbon steel, high carbon steel and alloy steel are covered. For plants making their own assemblies or maintaining their own chains, a section is devoted to repairing links, grab hooks, slip hooks, connecting links. The McKay Co.

169 Choosing the Right Valve—Presenting valve selection as a matter of matching the valve's service characteristics with the service requirements of the job, this practical 20-pp booklet explains and illustrates basic design features of gate, globe and check valves. It tells, in non-technical language, how each of these valve types works, and where it is best suited for use. Disc, stem connection, bonnet and bonnet-joint characteristics are also discussed and the importance of stem operation is treated. A final chapter is devoted to common materials of valve construction. Crane Co.

170 Statistical Quality Control — This comprehensive 52-pp booklet is a complete case history of the application of statistical quality control to company's own manufacturing operations, and it presents an over-all program and specific procedures. Through use of photos, charts, graphs, actual records and mathematical formulas, this booklet serves as a technical handbook covering all phases of the manufacturing picture—design, planning, engineering, tooling, purchasing, production control and inspection. Marchant Calculators, Inc.

171 Piping for Permanence—In presenting corrosion fundamentals of plumbing and heating systems, this 32-pp illustrated booklet contains data based on analysis of thousands of wrought-iron piping systems. Chapters are devoted to requisites of a piping material, building-piping systems, and water and its problems. Includes many service records. A. M. Byers Co.

172 Gas Heaters—How, why and when to use gas-fired unit heaters is outlined in pocket-sized Bulletin SA-541-A, 20 pp. Includes hints on heater selection and installation, schematic diagram explaining how heater works, instructions for estimating heat loss and computing gas requirements. Reznor Mfg. Co.

DUST CONTROL

173 Cupola Dust Control—Bulletin 3, 8 pp, contrasts the Dorfan dust and fume control system for collecting cupola dust "dry" with many other systems of cupola dust control, citing advantages of economy and simple operation. Mechanical Industries, Inc.

174 Dust Control, Blast Cleaning—Bulletin Cleaning 1210, 24 pp, fully illustrated, describes manufacturer's line of blast cleaning and dust control equipment, accessories. It is indexed according to equipment, type and purpose. Lists three methods of abrasive application, describes equipment using them. Pangborn Corp.

175 Dust, Fume Control—Dorfan dust and fume control systems for the collection of fumes from dryers of all types, electric steel furnaces, other installations, are detailed in this bulletin. Lists other company products including dust and fume filters, arresters, rotary valves. Mechanical Industries, Inc.

METALS

176 Continuous-Cast Bronze—How Asarcon 773 continuous-cast bearing bronze can save money in maintenance and production by virtue of its advantages in length, size, machining time, metallurgical characteristics and physical properties is explained in this 6-pp bulletin. Also details the process by which a variety of bronze alloys is cast into rods, tubes and shapes. Continuous-Cast Products Dept., American Smelting and Refining Co.

177 Aluminum Utility Sheet—Applications, specifications, and availability of company's utility sheet are given in this folder. Special emphasis is placed on use of utility sheet for duct work. Greater heat delivery, ease of fabrication, smaller duct requirements and other advantages are cited. Tables show weights and coverages. Kaiser Aluminum & Chemical Corp.

178 Steel Casting Manufacture—This 32-pp brochure, written in non-technical language, treats the entire process of steel casting manufacture, from design and engineering to final applications. Begins with company's history and early development of Circle-L castings. Lebanon Steel Foundry.

METAL WORKING

179 Hydro-Broach Machines — Twelve-pp Catalog M-1848 on duplex vertical hydro-broach machines, tells what you should know about surface broaching to gain full benefits of its possibilities. Gives design features and advantages of the machines, describes and pictures some applications. Specifications and dimensions included. The Cincinnati Milling Machine Co.

180 Press Brakes—Comprehensive Bulletin 89-C, 32 pp, introduces a new line of press brakes. Describes and illustrates such key features as double end twin drive, rigid frame construction, electro pneumatic clutch. Also includes detailed specification tables for the 50- to 775-ton line, fundamentals of press brake work, and data for computing bending, punching and blanking tonnages. Niagara Machine & Tool Works.

LUBRICANTS, LUBRICATION

181 Anti-Corrosion Lubricants—Specialized lubricants for application against corrosion and leakage loss, especially when vacuum pump cylinders, pump packing glands, plug-type valves are used, are described in Bulletin BK-20, 8 pp. Lists lubricants for many industries under various operating conditions. Includes application table, selector chart showing how lubricants can be used against some 160 corrosives, solvents. Keystone Lubricating Co.

182 Dispersions for Industry—This bulletin lists 40 dispersions of colloidal graphite, molybdenum disulfide, vermiculite and zinc oxide. Gives typical applications, densities, carriers, other data. Includes listing of dispersions offering advantages of new epoxy resins as bases for 'dag' colloidal graphite and molybdenum dry-film coatings. Acheson Colloids Co.

183 Textile Machine Lubrication—Of interest to plant engineers in the textile industry is this 16-pp bulletin covering automatic lubrication of blending, picking, carding, combing, drawing, spinning, spooling, knitting, weaving and other machines. Tells how one oil pump per machine force-feeds a controlled volume of oil through a single-line distribution system to meter-units which apportion oil in correct amounts to each bearing. Lubricator, distribution system and meter-units are explained. Bijur Lubricating Corp.

OTHER EQUIPMENT

184 Diesel Engines — Four-cycle, solid-injection diesel engines for continuous heavy duty stationary service or for stand-by service are described in Bulletin 247, 6 pp. Gives general characteristics of these engines which range from 105 to 280 bhp, also specifications and over-all dimensions. Ten salient features are discussed. Wolverine Motor Works, Inc.

185 Industrial Ovens—Engineering, manufacturing and installation of processing ovens are described in Bulletin D-53-20, 16 pp. Covers oven types, application to industry, source of heat, selection of heaters, control of heat, distribution of heat. Photos show typical oven installations, and a complete modern finishing process is presented. Newcomb-Detroit Co.

186 Sintering Lightweight Aggregates — Company's sintering process for producing high quality, lightweight aggregates at low cost from clay, fly ash and other industrial residue is discussed in Bulletin 151. Stresses advantages of low fuel requirements, high output of manufacturer's sintering machine which can be operated continuously or intermittently. Ex-

BULLETINS

(Begins on page 27)

plains uses of these aggregates in manufacture of building materials. Dwight-Lloyd, Inc.

187 Molded Packings—This 8-pp illustrated bulletin describes molded hydraulic and pneumatic packings, including company's Vee-Flex and Homogeneous V-Packing rings, and piston cups. Gives features and service recommendations, lists standard sizes. Packing Div., Raybestos-Manhattan, Inc.

188 Wire Products—Illustrated Bulletin 111 offers brief information on use of woven wire conveyor belts as an aid to automation; on industrial wire cloth for filtration, sizing, screening and dewatering; on woven wire slings; and on special metal fabrications. Also gives reference to catalogs on each of these products. The Cambridge Wire Cloth Co.

189 How Hardboards Cut Costs—This informative 8-pp brochure tells how hardboard is made and what it can and cannot do; and gives its physical properties, resistance to chemicals, bending radii, and finishing procedure. Describes the material's versatility and new applications in industry and shows how it is being used to save money in many manufacturing fields. Special information is included on sizes and thicknesses, die-cutting, drilling, sawing, fastening, shaping, laminating. Hardboard Div., Oregon Lumber Co.

190 Blast Nozzles—Catalog 27-A, 8 pp, describes a line of airblast cleaning nozzles and pressure blast hose fittings for standard airblast nozzles. Describes materials used, discusses control of compressed air consumption. Tabular data shows importance of controlling nozzle wear. American Wheelabrator & Equipment Corp.

191 Industrial Chemicals—Application experience and potential uses of two chemicals are outlined in 5-pp Bulletin C-117-7. The products, Palcotan and Palconate, are reactive chemicals derived from redwood bark and declared effective as dispersing agents, replacement for tannins, as battery expander, boiler water treatment. The Pacific Lumber Co.

192 Velocity Stage Turbines—Bulletin 4202, 4 pp, describes velocity stage turbines for mechanical drives, operating under steam conditions up to 600 psig and 750 F. Cutaway drawings shows design features. Lists specifications, features and accessories, dimensions. De Laval Steam Turbine Co.

193 Steam Condensers—Design and engineering features of company's condensers and facilities used in their manufacture are described in Bulletin 19B7987, 24 pp. Illustrates condenser types including conventional, single elbow, twin inlet, multi-steam path. Describes backwash systems for single- and two-pass condensers, air removal equipment for steam condenser service. Covers condensate and circulating water pumps in horizontal and vertical design, motors for pump drives. Allis-Chalmers Mfg. Co.

194 Hydraulics for the Textile Industry—Cost-saving and operating advantages of typical textile machinery oil hydraulic variable speed drive and power unit applications on pads, tentering frames, etc., are covered in 12-pp Catalog 54-66. Specifications, performance curves and operating data are given for six standard models of integral hydraulic transmissions and controls rated from ¾ to 25 hp. Specifications are included for 24 models of variable delivery and variable displacement piston-type hydraulic pumps and motors. Vickers, Inc.

195 Giant Cap Screws—Bulletin F. 2002 describes company's line of giant Unbrako cap screws of heat-treated alloy steel, from 1⅛ in. to 3 in. diam. Includes prices for diam of 1⅛ to 1½ in. lengths to 12 in.; shipping weights for all sizes. Shows how heads on bolts are hot forged; compares flow of metal in hot forged heat with machined bolt. Standard Pressed Steel Co.

196 Electric Furnace Control—New techniques and cost-reducing advantages of manufacturer's Hydro-arc electric furnace control are described in Bulletin F0-10, 6 pp. Describes major developments in arc furnace controls, gives fundamentals of new control designed to cut response time to 1/20 sec. Whiting Corp.

Postage-free Reader Service Cards are on pages 157-158. To use them, circle the item numbers of bulletins wanted. Be sure to include your name, your job title and company.

197 Hot-Dip Galvanizing—How hot-dip galvanizing is prolonging life of industrial equipment is stressed in this 16-pp booklet. Photos showing galvanized equipment in use accompany brief text explaining how this process of covering iron and steel with a protective coating of zinc serves to prevent rust. The galvanizing procedure is explained and illustrated. Coating comparison charts show how hot-dip galvanizing compares with other types of coatings as to rust resistance, dimension limits, shock resistance, initial and maintenance costs. American Hot-Dip Galvanizers Assn., Inc.

198 Rigid Plastic Material—The advantages, uses and available forms of Bolatron 6200 are presented in this catalog, about 14 pp. Gives dimensional data, tolerances, weights for sheet, bar stock, pipe, fittings and valves made of this unplasticized polyvinyl chloride. Includes thermal, electrical and mechanical properties, also detailed information on chemical resistance. H. N. Hartwell & Son, Inc.

199 Temperatures to Figure?—This handy chart determines Fahrenheit and Centigrade temperature equivalents for you. Its reverse side shows the easy reading feature of this company's thermometers made with glass red reading column. The chart is 8¼ by 3½ in. You can keep it in your pocket or under a glass desk top. Moeller Instrument Co.

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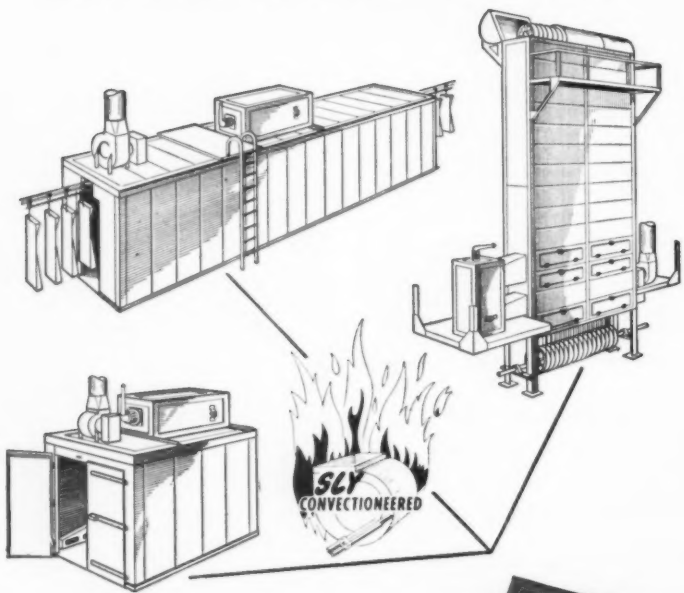

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STANDARD CATALOGS, bulletins and handbooks are listed to help plant engineers maintain a permanent data file. To get these free catalogs, circle item numbers of those wanted on postage-free cards provided for you on pages 157-158.

MECHANICAL POWER TRANSMISSION

201 **Power Transmission Equipment**—Form 118, 24 pp, gives descriptive and technical information on variable speed pulleys, wide V-belts, sheaves, motor bases, countershafts, and Select-O-Speed transmissions. Illustrated with photos and dimensional drawings, booklet provides ratings, sizes, application and installation tips. Lovejoy Flexible Coupling Co.

202 **Improved V-Belts**—This literature on company's Vulco rope drives explains how this rope with concave sides is designed to fill out to a precise fit in the sheave groove, to provide less wear, more pulley contact and more sure power when needed. The Gates Rubber Co.

203 **Power Drive Handbook**—Catalog 709, describing roller chains and sprockets, includes tips on selecting stock roller chains for every type of power drive service. Diamond Chain Co., Inc.

204 **Flexible Couplings**—Condensed Engineering Catalog 51-A contains excellent data on the choice and use of company's flexible metal couplings. Tells advantages of these couplings and discusses design principles. Double-flexing and floating shaft types, light duty couplings and types for special applications are described and pictured in detail. Thomas Flexible Coupling Co.

205 **Coupling or Converter**—To promote a better understanding of hydraulic couplings and torque converters, this 32-pp publication tells where couplings or torque converters should be used, and why, furnishing a source of facts on non-technical terminology. Covers meaning and characteristics of torque and effect on driving and driven equipment. Twin Disc Clutch Co.

206 **Transmission, Control Equipment**—Variable speed transmission and speed control devices are presented in 48-pp Catalog 45. Fully illustrated, provides descriptive and application information, operating principles, dimensional tables. More than 60 photos show use of this power transmission equipment in paper mills, food processing plants, textile plants, automotive plants, power plants, others. Lewellen Mfg. Co.

207 **Steel Couplings**—Bulletin 4100, 32 pp, provides engineering data covering the selection and application of company's standard Steelflex couplings. Large cutaway illustration shows construction features of these couplings which are designed to accommodate parallel and angular mis-alignment and free end float. Photos show industrial installations of these couplings. Book also lists brakewheel, controlled torque, high speed and other couplings for special applications. The Falk Corp.

INSTRUMENTS, CONTROLS

208 **Recording, Controlling Instruments**—Circular M-2-A, 48 pp, illustrates, discusses manufacturer's entire line of mechanical industrial instruments, including fixed stem and distant reading dial thermometers, temperature and pressure recorders, controllers, diaphragm motor valves. A listing of 9-, 10- and 12-in. circular recorder charts is also available. Weston Electrical Instrument Corp.

209 **Industrial Thermometers**—Fourteen-pp Catalog 101 describes and pictures company's Gotham line of thermometers, including the Multi-Angle which can be rotated and tilted to practically any position. Includes temperature equivalent table. U. S. Gauge Div., American Machine and Metals, Inc.

210 **Flow Meters**—Catalog 2320, 58 pp, fully illustrated, describes all types of manufacturer's flow meters, including indicating, recording, integrating and controlling instruments of evenly graduated and square root types, as well as area meters and differential converters. Includes tables on flow approximations, installation information, factors necessary to determine if fluid to be measured can be properly handled. Industrial Div., Minneapolis-Honeywell Regulator Co.

211 **For Liquids Worth Storing**—Bulletin 6405 offers an illustrated discussion of company's self-contained gages for liquid level applications, covering both direct- and remote-reading types, also a dial type hydrostatic gage. Stresses value of measuring stored liquids. Liquidometer Corp.

212 **Orifice Meters**—Bulletin 1050 Rev. 1, 28 pp, shows how manufacturer's orifice meters are made, how they operate. Tables give capacity data, and there are descriptions of manifold arrangements and differential ranges, along with illustrations of various parts. Sketches show how meters are used. Rockwell Mfg. Co.

213 **Electronic Controls**—Eight-pp Catalog F 6166 describes flexibility of an electronic control system for heating, ventilating and air conditioning. Describes temperature controls, control panel, sensing elements, as well as the ultra-sensitive micro relay which simplifies the amplifier. Barber-Colman Co.

214 **Wide Range Regulator**—Featured in Bulletin 316 is an expansion stem type temperature regulator operated by water or compressed air. Explains how regulator works. The Powers Regulator Co.

215 **For Efficient Air Control**—Sectional Catalog 20 contains a working file of data on manufacturer's air control products. In it, sections are devoted to couplers, blowguns, hose and fittings; air ejection sets; pneumatic press controls; air cylinders and operating valves; four-way valves; and miscellaneous air control equipment. Includes current price list. A. Schrader's Son.

ELECTRICAL EQUIPMENT

216 **Motor-Generator Reference Book**—Publication 51R7933 is a 50-pp booklet compiled to assist in the selection of motive power to handle most industrial applications. Neither text book nor ordering catalog, this book provides a brief outline of the various types of motors, generators and motor-generator sets, telling their application and operating requirements. Booklet is generously illustrated and includes performance data, ratings, information on methods of speed control. Allis Chalmers Mfg. Co.

217 **Motor Controls**—In this 28-pp bulletin the most important items in company's line of standard motor control apparatus for all industries are presented. Controls, starters and accessories are described and applications listed. Allen-Bradley Co.

218 **Brakes and Brake Motors**—Construction advantages of company's brakes are featured in illustrated Bulletin SL-610-1 on brakes and brake motors. Dimensions, mechanical and electrical characteristics. Crocker-Wheeler Div., Elliot Co.

219 **Motor Lubrication Tips**—"To Grease or Not to Grease" is an illustrated bulletin on lubrication of ball bearing motors. Gives general information on lubricants and lubricating agents. Discusses importance of lubrication to bearing life. Also covers choice of lubricant and procedure. Wagner Electric Corp.

220 **Motor Starters**—Booklet 1062, 16 pp, describes motor starters having short circuit protection for 2200- to 5000-v systems. Illustrates starters using company's 50,000 kva interrupting capacity type ZHS contactor; also starters which will safely interrupt the circuit from a bus of unlimited capacity. Indoor and outdoor installations are pictured. The Electric Controller & Mfg. Co.

221 **FHP Manual Starters**—Bulletin 224 is a folder giving the features and ratings of a line of fhp starters. Lists their applications, and pictures enclosures. Square D Co.

222 **The Answers on Wiring**—"20 Questions and 20 Answers on Safety m.i. Wiring" describes and illustrates characteristics and advantages of this new wiring system. A complete table of types, sizes, weights, and lengths, as well as a partial list of users included. General Cable Corp.

223 **Power and Control Cables**—Sixty-pp Catalog 24 describes typical power and control cable designs and is intended as a guide in selecting proper wire and cable type. Describes insulations, sheaths and coverings, electrostatic shielding, and includes product data on all types listed. Rome Cable Corp.

224 **Small Bus Duct**—Detailed information on a midget-size bus duct is contained in Bulletin 703. Illustrates entire unit, also trap and hanger. Text discusses major parts, design features. Includes list prices. Frank Adam Electric Co.

225 **Air-Cooled Transformers**—Eight-pp Bulletin 153-A describes air-cooled dry-type transformers, stressing their advantages and listing typical applications. Illustrates, and gives construction details and specifications for standard types. Also pictures some special transformers and reactors. Sorgel Electric Co.

226 **Handbook on Storage Batteries**—This 64-pp booklet of instructions and technical data is the sixth edition of this company's battery service manual. Provides a brief treatise on the theory of the lead-acid battery. Gives detailed instruction on the care and operation of batteries, on maintenance and repairs, and on standard and special parts. Booklet is of special value to plant engineers concerned with storage batteries for cycle service in industrial trucks and materials handling equipment. Gould-National Batteries, Inc.

227 **Battery Maintenance Tips**—Form 5063 is an 8-pp pocket-size booklet on storage battery maintenance which breaks down battery care to seven basic rules, each emphasized by cartoon treatment and brief text. Booklet is suited for distribution to maintenance personnel as well as to those indirectly associated with batteries, such as purchasing department personnel. Includes suggested maintenance chart forms. Exide Industrial Div., The Electric Storage Battery Co.

228 **What You Should Know About Circuit Breakers**—Sixteen-pp Manual 101 explains operating principles of basic circuit breaker designs and provides engineering data on factors of application. Includes simplified diagrams of three basic types. Illustrates with colored charts and diagrams, explains temperature factors, inrush current effects, tripping and reset time. Heinemann Electric Co.

229 **Commutator, Slip Ring Maintenance**—This practical little 40-pp handbook gives procedures and methods for commutator and slip ring maintenance. Generously illustrated with photos and sketches, booklet contains sections devoted to common troubles and their correction; brushes; general maintenance; and company's products for maintenance of commutators and slip rings. Defines commutator terminology. Ideal Industries, Inc.

230 **Flexible Cords**—This well-illustrated 24-pp booklet includes all new Underwriters' classifications for flexible cords manufactured by this company. Featuring data on Dynaprene and rubber jacketed cords as well as braid covered types, also gives tips on how to select proper cord. Whitney Blake Co.

MATERIALS HANDLING

231 **Engineered Monorail Applications**—A file of application literature is announced as the beginning of a new service offered potential users of monorail equipment. Includes a technical booklet on automatic dispatch systems and an equipment bulletin in addition to several case studies of installations. As they are completed new groups of case studies will be sent to holders of file. Available to qualified plant engineers. The American MonoRail Co.

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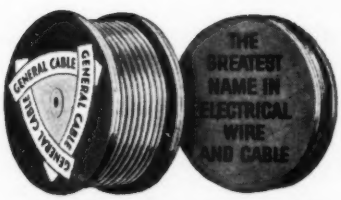

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DATA FILE

(Begins on page 162)

232 Data on Tramrail Equipment—Twelve-pp Form 2008F is a well organized booklet on tramrail systems. Tells what an installation can do toward improving handling efficiency. Rail and arch design, switches, cranes and transfer bridges, carries, hoists, cranes, buckets, grabs are pictured. Cleveland Tramrail Div., The Cleveland Crane & Engineering Co.

233 Locomotive Cranes—Catalog 84, 16 pp, stresses advantage of the torque control unit used in company's cranes and features illustrations of the mechanism and converter unit. Describes in detail the sealed, anti-friction bearings, air controls, brake, limit switch and other components. Orton Crane & Shovel Co.

234 Grips for Safe Handling — Bulletin 220B, 24 pp, pictures and gives ordering and application information on hooks, tongs, grips, and slings. Covers their use with a wide range of materials, including steel plates, pipe and round bar stock, drums and barrels, coils, cartons, baled material, timbers. Also lists chain pocket wheels and guides. Includes current price sheet. Downs Crane & Hoist Co.

235 Sheet Lifter—Operational and design features of company's sheet lifting equipment which contributes toward efficient handling, flexibility and economy are explained in Bulletin S-25, 16-pp. Cullen-Friestedt Co.

236 Floor Cranes — 1954 models of this manufacturer's hydraulic floor cranes are described and pictured in the 8-pp bulletin. Shows cranes from 1000- to 6000-lb capacities, giving applications and special features of each. Ruger Equipment, Inc.

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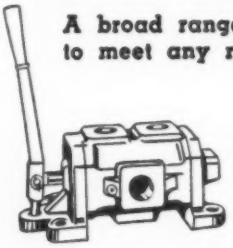

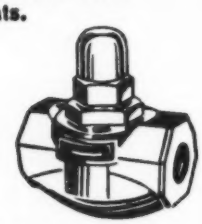

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237 Conveyor and Elevator Belting Tips—This 32-pp manual on installation, maintenance and care of conveyor and elevator belting, uses photos and drawings to show ways to improve belt service and lengthen belt life. Includes a discussion of belt design, covers, reinforcements and grades. Repair methods, splicing, and fastening are also covered, and there's a table listing common conveyor belt maintenance problems with their causes and remedies. The B. F. Goodrich Co.

238 Oilless Bearings for Conveyors—Technical Catalog 210, 20 pp, gives detailed information for specifying, installing and use of bearings for screw and roller conveyors, together with operating characteristics. The sectionalized catalog provides tabular data and dimensional drawings to facilitate indentification of bearings for replacement. Arguto Oilless Bearing Co.

239 Continuous Power Conveyor—Sixteen-pp Catalog A-96 describes a packaged overhead conveyor for light duty applications. This complete basic "package" contains drive unit, take-up, oiler and other items essential for a 50-ft system. Describes power drive unit, track, power chain and other components and discusses lubrication and chain safeguards. Suggested layouts are diagrammed, and some installations of these conveyors are illustrated. Richards-Wilcox Mfg. Co.

The two Reader Service Cards on pages 157-158 are easy to use and need no postage. Just circle the item number of catalogs wanted.

240 Engineered Conveyor Systems—Catalog 853, 32 pp, illustrates conveyor systems in use in a wide range of industries showing how they suit handling requirements involved. Roller, wheel, belt, chain, overhead trolley and elevating conveyors are included, also spirals portable power conveyors ball transfers and special equipment. Mathews Conveyer Co.

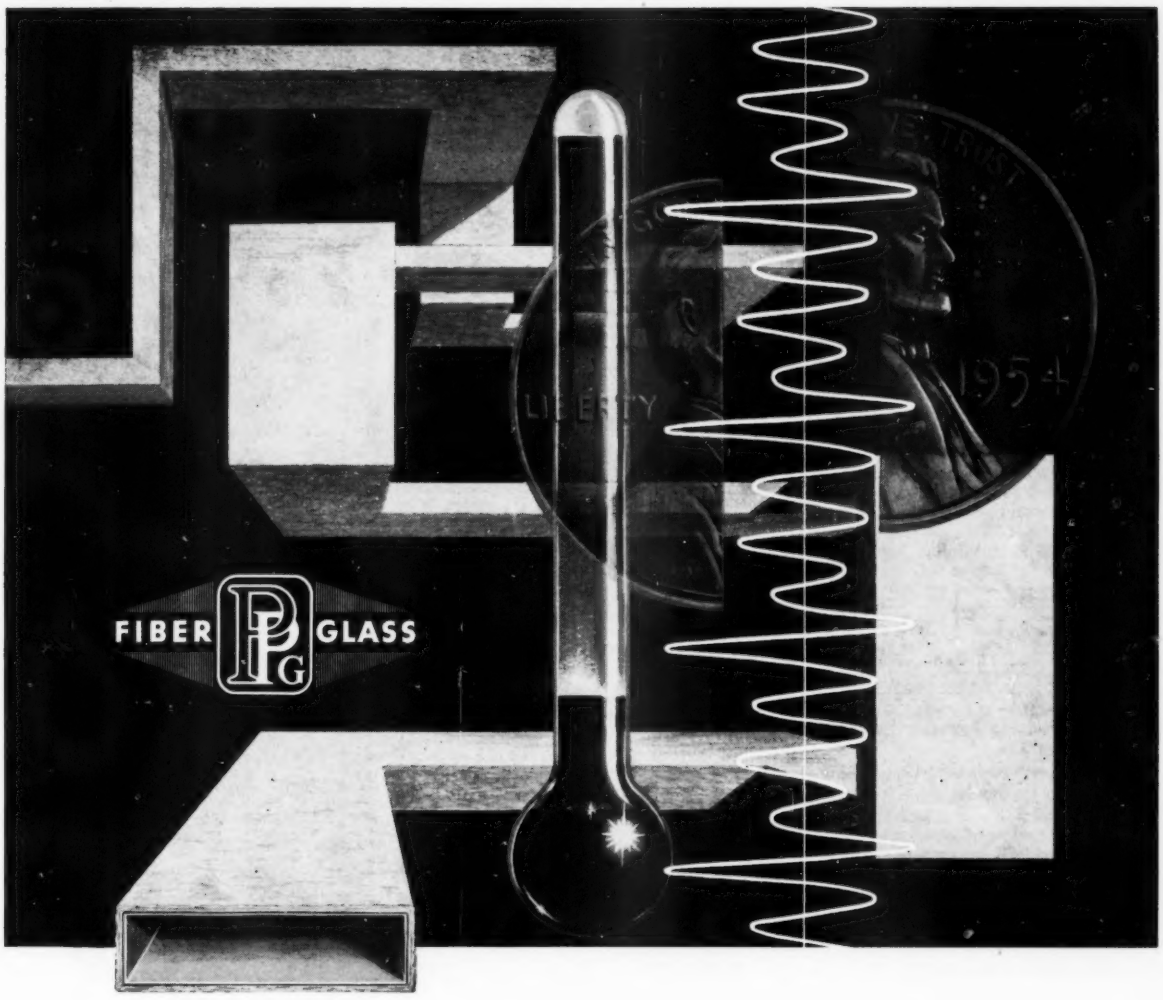
241 Truck Operating Tips—How to get the most out of walkie-type electric industrial trucks is told in revised Bulletin P-1033, 16 pp. Using brief text and interesting cartoon technique to illustrate the points, booklet serves as a guide for efficient operation and maintenance of company's Worksaver electric trucks. Its approach is general enough, however, to be of value in the operation of any motorized hand truck. The Yale & Towne Mfg. Co.

242 For "Floor Level" Handling—Junior-Catalog 535 is the 100-pp eleventh edition of company's well known pocket-size catalog. Contains information, illustrations and specifications on fork trucks, high lift electric trucks, pallet trucks, industrial tractors, electric and hand lift trucks, Steeleg skids and boxes, semi-live skids and lifters, portable elevators and cranes, stacking frames, storage racks, die tables, and other handling specialties. Barrett-Cravens Co.

243 How to Pick a Truck — Catalog 54, 8 pp, features a step-by-step procedure for making the best fork truck choice for a particular handling job. Other sections in the booklet show at a glance complete specifications on each of company's trucks, and illustrates important construction and design features. The Baker-Raulang Co.

244 Shovel and Loader—Described in 12-pp Bulletin 1932 is a hydraulic crown and hoist shovel and loader incorporating mechanical features usually associated with big shovels. Illustrates, gives specifications, application information on both pneumatic traction and crawler traction models. Dempster Bros., Inc.

245 Elevator Sills—This illustrated bulletin describes elevator sills which operate like a drawbridge. Features a model for mounting on the elevator itself which, when lowered, bridges gap between floor and elevator and, when upright, serves to keep trucks from rolling to elevator edge. Also describes a model for mounting to building floors, one designed for truck loading and other special models. Alexander Sill Co.



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246 Industrial Logistics—Form A-9516-4450 is a 12-pp booklet covering strategic handling of materials from raw state to distribution. Discusses master unit load and transportation cycle. Explains company's system of adapting all loads to four types of containers, assembling maximum numbers of these into master unit loads, and transporting them as single units. The Elwell-Parker Electric Co.

247 Railway Car Mover—"Reports from the Field on Trackmobile Savings and Advantages" tells how this small unit travels on road and track hauls and switches frieght cars and requires only one operator. Stresses economy and easy handling. Whiting Corp.

248 Material Handling System—Catalog 83 is a 12-pp booklet showing different units in company's Work-O-Matic system. On-the-job photos show material positioning with bin boxes and gravity fed hoppers, and tiering, storing and dumping with multi-duty boxes and trays. Picture stories tell how end-loading scoops and multi-duty trays go further in integrating production, storage, material movement and disposal than previously thought possible. Union Metal Mfg. Co.

249 For Hopper Economy—"In Dollars and Sense" explains long run economy of company's self-dumping hoppers, showing how they operate and telling how they fit particular plant requirements. Illustrated with photos, gives dimensions, weight of a standard 1-yd model. Roura Iron Works.

250 Chain Hoists—Catalog 61, 32 pp, covers a line of chain hoists, telling how to select and use them. Provides an illustrated comparison chart of hoist types, a selector table and discussion of factors to be considered in buying a hoist. Multiple gear chain hoists, screw gear chain hoists, differential chain hoists described separately. Reading Crane & Hoist Corp.

251 Manual on Electric Hoists—Catalog H-46, 40 pp, covers monorail and stationary hoists and car pulleys. Explains fundamental types of grabs, methods or hanging I-beams, types of hoist suspension, controls. American Engineering Co.

252 Industrial Lifts—This booklet presents a wide range of elevating equipment designed to step up efficiency and cut handling costs. Covers dock lifts, crossover bridges, sidewalk elevators, service lift. The Wayne Pump Co.

253 Electric Hoist Manual—Catalog 215-B offers 38 pp of engineering, application and ordering information on company's Load Lifter electric hoists. Presents hoists with hand operated trolleys and with power travel, hoists with lug suspension, hook suspension and push-type trolleys, and with hand-geared trolleys, hoists for low head. Manning, Maxwell & Moore, Inc.

254 Trolley Hoists—Bulletin DH-269, 2 pp, describes and pictures ½ to 3 t capacity army-type trolley hoists, plain or geared, for use where a close headroom assembly is required. Gives dimensional and capacity data, prices. Wright Hoist Div., American Chain & Cable Co., Inc.

255 Portable Hoists—This bulletin describes a lightweight air hoist in 2000, 1000, 500 and 300-lb capacities. Gives specifications, dimensions. Keller Tool Co.

256 Handling Equipment—Several of this manufacturers new products are described in this comprehensive 48-pp catalog, including steel boxes with lap joints, a stand and reel for handling steel coils and a new type nesting stacking box. Book presents a wide range of other materials handling equipment—stacking boxes, skid boxes, skids, racks, trucks and trailers. Fully illustrated, gives sizes and application suggestions. Palmer-Shile Co.

257 Versatile Palletizing System—A system of materials storage in which practically anything can be palletized is described in this 16-pp illustrated booklet. Provides check list of points to be considered in selecting a storage

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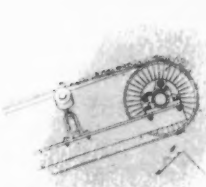

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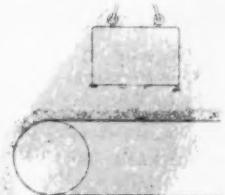

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system and explains how manufacturer's equipment is designed for adaption to individual plant requirements. More than 25 installations are pictured. Tiering racks, deck, shelving and tiering hardware are shown. The Paltier Corp.

FANS, BLOWERS

258 **Fan Engineering Data**—Bulletin A-108, 16 pp, gives fan laws and formulas, terminology, and recommended velocities for exhaust hoods. Includes air pressure conversion table, charts on dust resistance, entrance losses and rectangular equivalent of round ducts. Discusses fan installation, maintenance and lubrication. Also touches upon the noise problems commonly associated with fan installations. Hartzell Propeller Fan Co.

259 **Industrial Fans** — Propellair Bulletin 650, 12 pp, contains dimensions, application, and performance data of Tubeaxial and Stack-booster fans. Gives information on cooling and drying problems, system and open surface tank ventilation. Robbins & Myers, Inc.

260 **Heavy Duty Fans** — Eight-pp Catalog 1380 describes three classes of company's Series 2000 heavy duty fans for induced draft service. Gives maximum wheel speeds, total pressures, volume ranges. Presents graph of certified hp, efficiency and pressure rating of new blade design, factors contributing to ratings. Discusses optional inlet damper control. Sturtevant Div., Westinghouse Electric Corp.

PUMPS, COMPRESSORS

261 **How to Solve Pumping Problems**—A new printing of this popular 36-pp booklet makes it again available to plant engineers. Filled with helpful technical information, explains design and operation of rotary gear pumps and discusses factors of pumping problems, covering some sample ones in detail. Illustrated, provides friction loss and conversion tables, electrical data, viscosities of liquids, construction materials for handling various liquids, resistance of valves and fittings to flow of fluids. Geo. D. Roper Corp.

262 **Screw Pumps**—Twelve-pp Bulletin S-205 is devoted to company's standard gear-in-head, high pressure long body gear-in-head, and standard vertical gear-in-head types. Basic construction and design are discussed in detail and there are sectional views with indicated features, also installation pictures. Dimensions are included. Warren Steam Pump Co., Inc.

263 **For Abusive Pumping Jobs** — Catalog 4906, 36-pp, covers centrifugal pumps for wide, industrial use and especially adapted to handling ashes, abrasive mixtures, slurries, hot and corrosive liquids. It describes several basic types; a horizontal shaft, single-stage side suction pump; a horizontal shaft, single-stage, rear-entrance automatic priming pump; vertical shaft pumps with standard, overhead and quill bearings for wet pit applications. Nagle Pumps.

264 **Data on Pumps**—This 12-pp condensed catalog covers turbine-type and centrifugal pumps for a wide range of industrial uses. Gives construction specifications, capacities, application information as well as reference to specific literature on each type. Fully illustrated. Also includes data on mixed flow pumps, sump pumps. Aurora Pump Co.

265 **Bronze Pumps** — Application information, construction features, dimensions and capacities of a line of bronze pumps are given in this 12-pp bulletin. Illustrated with photos, sketches, it covers several types of rotary gear pumps, also an open impeller centrifugal pump for limited volume liquid transfer. Oberdorfer Foundries, Inc.

266 **Condensed Pump Data**—Form 4383-J covers more than 20 types of general service pumps, rotary pumps, sump and drainage pumps, condensate units, self-priming units, stainless steel pumps and high pressure pumps. In easy-to-find tabular form, each model is pictured along with its characteristics, applications, and features. Goulds Pumps, Inc.

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267 **Vertical Compressors** — Double-acting, motor driven vertical compressors are described as to distinctive features, regulation, available and construction detals in 16-pp illustrated Bulletin 765-5. The improved cylinder design of these compressors and valve assemblies are discussed in detail. Booklet also describes air intake filters, air receivers and aftercoolers available; and pictures some installations of the compressors. Chicago Pneumatic Tool Co.

268 **Centrifugal Compressors** — Twelve-pp Bulletin 109 describes and pictures single-stage centrifugal compressors for delivering large capacities of pulsation-free air or gases. Their functions, applications, ratings, construction features, arrangements, and methods of control are presented. American Blower Corp.

269 **Multi-Stage Compressors**—Featured in 36-pp Bulletin 116 is a presentation of engineering data and performance characteristics to enable plant engineers to approximate power requirements, rotative speed and discharge temperature for most multi-stage centrifugal compressor applications. Clark Bros. Co., Inc.

270 **Air Compressor Selection Data**—Factors to be considered in selecting a compressor are discussed and selector charts provided in 20-pp Bulletin IDC 9302-3, covering manufacturer's Y and G air compressors. The Y line includes tank mounted and bedplate units, single- and two-stage types. Special features of each model are described, dimensions and ratings given. Westinghouse Air Brake Co.

PACKINGS, GASKETS, SEALS

271 **Packings and Gaskets**—In this 40-pp belting and packing manual (NY-2697-P) are helpful charts plus information on the care, use and maintenance of rod and sheet packings and gaskets. A complete engineering section contains all necessary charts and tables for determining working specifications of packings. Also included are packing recommendation charts. New York Belting and Packing Co.

272 **Braided Rod Packing**—This 8-pp bulletin outlines advantages of company's lattice-braid rod packing. Contains sectional drawings, showing their unique structure, illustration of types available, tables of service recommendations, specifications. The Garlock Packing Co.

273 **Shaft Seals**—Form 455, 12 pp, presents a mechanical seal that rotates with the shaft and is designed to meet sealing requirements of centrifugal and rotary pumps, agitators, blowers, other rotating equipment. Explains advantages of these seals, gives recommended uses for six types, also for a double seal and a cartridge, sleeve seal. Durametallic Corp.

VALVES, TRAPS, PIPING AND ACCESSORIES

274 **Bronze Valves**—Globe and angle bronze valves with rising stems, union bonnets and stainless steel plug type seats and discs are described in this bulletin. Discusses design advantages, gives dimensions and specifications. Walworth Co.

275 **Valves and Fittings**—Illustrated Catalog 47 provides over 60-pp of ordering information and application data on valves and fittings made of stainless steel and other corrosion resistant alloys designed for use where corrosion or contamination are factors. Gate, globe, and angle valves for a wide range of services are presented, also needle valves, sampling valves, screwed and flanged fittings. Design and construction details are shown. Also included is a chart of first and second recommendations of alloys for corrosive media. Alloy Steel Products Co., Inc.

276 **Relief Valves** — Twenty-pp Publication 5200 is replete with data on company's multi-port relief valves for steam, air and gas service. Charts, diagrams, tables and examples of plant operating conditions serve to show how to select a relief valve. Text and illustrations show advantage of these valves over other relief

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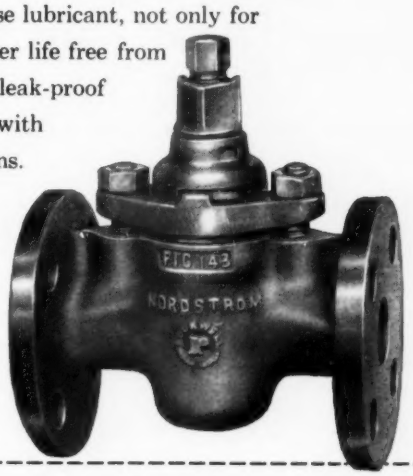

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valves, and booklet also shows how the Multiport relief valve can be used as a differential pressure spillover valve or as a check valve in closed systems. Cochrane Corp.

277 **Bin Gates, Valves**—Twenty-pp Bulletin 1252 covers manufacturer's line of gates and valves, including the Twistite double closure bin valve and the Moore bin gate. The latter, for heavy duty applications, consists of an apron belt which can be rolled away from the bin opening. Complete details and dimensions are provided. Stephens-Adamson Mfg. Co.

278 **Valve Maintenance Guide**—"Prevent Valve Failure Before It Starts," is a 28-pp text on valve selection, installation, inspection. Pictures damaged valves, explains how damage could have been prevented, discusses maintenance schedules, inspection jobs, lubrication, pipe line checking, threading, regrinding, disc replacement. Jenkins Bros.

279 **Steam Trap Book**—Catalog J, 44 pp, includes physical data and prices on cast semi-steel and forged steel inverted bucket steam traps, compound steam traps and ball float air and air relief traps; a handbook section explaining how to calculate condensate loads and select traps for all classes of equipment; a maintenance section. Armstrong Machine Works.

280 **Steam Trap Reference Manual**—Bulletin T-1740, 24 pp, tells why and where steam traps should be used; explains desirable trap features. Advantages of company's impulse steam traps are described, their operation illustrated. How to figure trap sizes and how to size condensate return lines are told and capacity and pipe dimension charts and thermodynamic properties of saturated steam included. Yarnall-Waring Co.

281 **Piping Pointers**—This is company's popular piping manual covering fundamentals of sound piping practices. Discusses various types of valve designs and how each should be used. Pictures and names more than 80 kinds of fittings and contains many illustrated how-to-do-it features. Included with the manual is an 8-pp valve selection guide. Crane Co.

282 **Light-weight Pipes**—As a practical help to pipe users, Bulletin 507 shows typical applications of company's light-weight lockseam-spiralweld pipe and fittings. Includes standard specifications on pipe from 4- to 3-in. diam, also data on fabricated fittings, flanges, connections. Naylor Pipe Co.

283 **Aluminum Jacketing**—Economy and reduced maintenance offered by use of company's aluminum jacketing for insulated lines are stressed in illustrated Form J-1. Details fast application, corrosion protection afforded, other advantages. Step-by-step photos show how jacketing is applied. Includes specifications. Childers Mfg. Co.

284 **Packless Expansion Joints**—Bulletin 35-51A offers 28 pp of up-to-date information on company's Corruflex joints, their design and installation and advantages over other means of providing for thermal expansion in pipelines. Construction features are explained and illustrated; simplified selection data include tables for determining amount of expansion in pipelines. American District Steam Co., Inc.

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285 **Welded Fittings**—Catalog 3 is a 36-pp ordering and engineering reference book on company's Weldolets for piping services. Gives data on butt-welding and socket welding Weldolets as well as on Thredolets for making threaded outlets. Typical installations are pictured; sizes, weights and prices provided. Also included are installation instructions and a technical section. Bonney Forge & Tool Works.

286 **Handbook on Fitting Flanges**—Catalog wf-1950, 68 pp, offers working information on seamless carbon steel welding fittings and forged steel flanges. Includes dimensional tolerances, thread standards and threading practice; service pressure, ratings, physical and chemical requirements. Grinnell Co., Inc.

MAINTENANCE

287 **Basic Roofing Information**—"What You Should Know About Your Roof" is a 40-pp, clearly illustrated booklet which tells what makes a roof fall, how to recognize signs of roof deterioration, what to do to keep a roof in good condition. Discusses recommended roofing practices, essentials of a good re-roofing job, also special features of company's roofing materials. Johns-Manville.

288 **Tar Base Coatings**—Now available is a collection of five bulletins on company's 100 series of cold applied tar base coatings. One bulletin gives general information on the full line and provides an application chart. The others give detailed specifications and application information on the various types. These include a coating for protection against severest corrosive conditions; a thin high gloss coating for general maintaining purposes; a coating for protection against generally severe corrosive conditions; and one for water tank interiors. Pittsburgh Coke & Chemical Co.

289 **Painting with Aluminum**—Again made available to plant engineers is Form AD-228, 32 pp, on the use of aluminum paint. Discusses advantages of aluminum paints, describes three basic types for non-absorbent surfaces for weather-exposed wood, and for heated surfaces and those not exposed to weather. Typical maintenance applications are covered in text and picture and practical suggestions for good

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results included. Use of aluminum paint on steel, galvanized metal, wood, masonry is detailed. Aluminum Company of America.

290 **Protective Paints**—Details on a rubber-base paint formulated to afford increased protection against corrosion from acids and alkalis, and especially applicable for use on concrete, are provided in this literature. These finishes are also suggested for wood and metal surfaces. Cellulose Products Dept., Hercules Powder Co.

291 **Blower-Suction Cleaner**—Data on a portable combination blower suction cleaner for cleaning machinery motors, stock bins are offered. Describes models available, attachments for a wide range of cleaning jobs. Clements Mfg. Co.

292 **Building Maintenance**—Handbook 7 offers 64 pp of information on floor surfacing, leak stoppers, external wall sealants, road patching, roofing materials. Includes instruction for use. Flexrock Co.

293 **Proper Care of Floors**—Filled with what-to-use and how-to-use-it information, this 32-pp booklet is a well written, practical text on floors. Presents floor preservation as a triple process involving cleaning, sealing and maintaining. Discusses various floor surfaces and their special problems. Gives helpful hints on floor maintainance and provides a handy chart covering preparation procedures and products for 12 common floor surfaces including cement, wood. West Disinfecting Co.

294 **Combination Scrubber-Vacuum**—A single unit that applies the cleanser, scrubs, and picks up—all in one operation—is described in this illustrated literature. Gives full specifications for company's Model 213P, for large area floors, and gives various methods of combination-machine-scrubbing suggested for hard, soft, oily floors. Also covers units for smaller and larger operations in gasoline-powered as well as electric models. Finnell System, Inc.

295 **For the Overhead Jobs**—Scaffolds designed to make overhead work safer and easier are described in 16-pp Form 10-852. Illustrates and discusses adjustability, large working platform, easy assembly, self-locking trusses and other advantages. Baker-Roos, Inc.

CONSTRUCTION

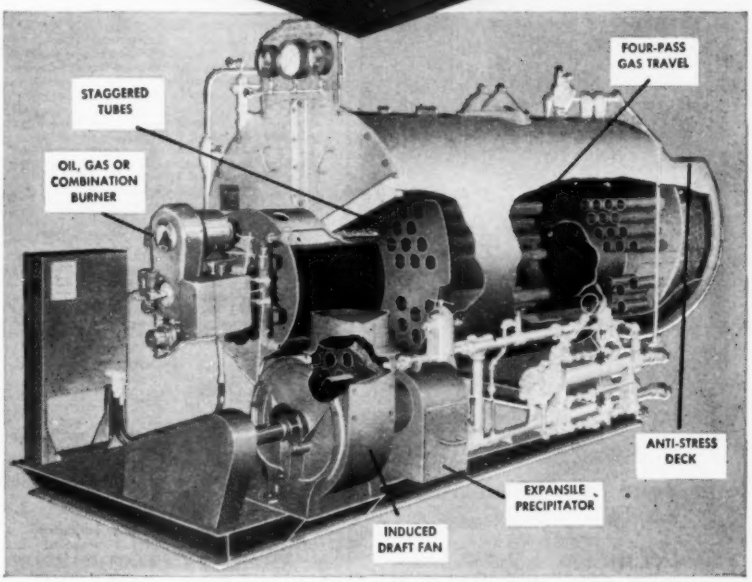
296 **Waterproofing Membrane Fabric**—The use of Fiberglas in company's waterproofing membrane is told in "Let's Look At Membranes" 16 pp. Comparisons of Glasfab and other types of membranes are drawn, and complete application methods described. Several case histories, covering industrial roofing jobs, highway bridges, pipe lines and chemical piping, show versatility of product and how it is applied. Twinsburg-Miller Corp.

297 **How to Use Presdwood**—This 32-pp booklet is filled with design and construction data on Presdwood. Although much of the material presented deals with use of Presdwood in homes, the book offers suggestions of value in industrial construction and remodeling. Sections of this practical handbook cover product data, working, application information for both interior and exterior use, and specifications. Includes instructions on proper conditioning, use of adhesives, types of bends finishing, interior joints, fastening. A table shows properties, sizes available. Masonite Corp.

298 **Where to Use Your Stud Driver**—Twenty-pp pocket-size Form 955 describes and pictures applications of studs, using company's Model 450 stud driver. Provides some operating hints and safety precautions and covers use of studs through steel into concrete, wood into concrete, wood into steel and steel into steel, as well as their use for attachment of pre-drilled fixtures. Remington Arms Co., Inc.

299 **Heat Absorbing Glass**—This 16-pp catalog describes Coolite, a glass designed to trap and absorb much of the sun's heat and to filter out annoying glare. Discusses types and thicknesses, gives light transmission data. Pic-

Look into the MOST EFFICIENT STEAM PLANT



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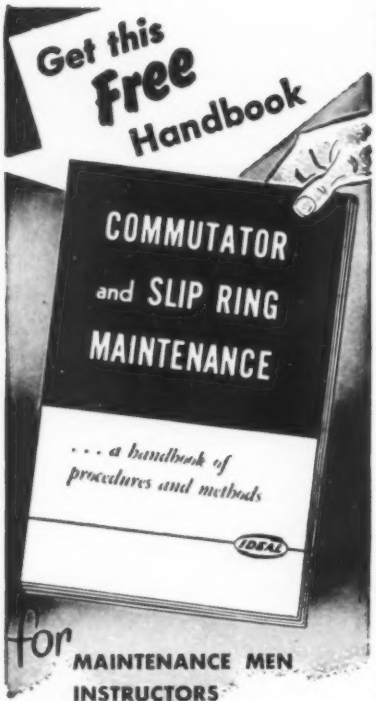

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DATA FILE

(Begins on page 162)

tures many industrial installations and shows how conditioned natural illumination helps reduce operating costs. Mississippi Glass Co.

300 **Translucent Structural Panels**—Bulletin 533, 12 pp describes Resolite, a translucent structural material, corrugated or flat, molded of thermosetting polyester resins reinforced with woven glass fibers. Illustrates use of Resolite in partitioning, skylighting and decorating installations. Provides standard sheet specifications, general information on colors, weights, light transmission, thicknesses. Resolite Corp.

301 **Air Tools, Paving Breakers**—These two bulletins describe company's latest models of paving breakers and air tools for plant construction and maintenance work. Bulletin PB1 gives features and specifications on heavy-duty, medium-weight and lightweight paving breakers, as well as tools for use with them. Bulletin ST-100 describes and gives specifications for clay spaders, trench diggers and backfill tampers. Gardner-Denver Co.

TOOLS, WELDING AND MACHINE SHOP EQUIPMENT

302 **Tools for Mechanics**—Catalog U is a 106-pp ordering book covering a wide range of power and hand tools for production, maintenance and service work. Describes, pictures and gives application tips and sizes on wrenches of all types, pullers, drills, sanders, polishers, grinders, reamers, taps and dies, testing tools, soldering irons, tool sets, benches and cabinets. Includes price list. Snap-on Tools Corp.

303 **Hydraulic Pullers** — Industrial maintenance problems involving removal and installation of gears, bearings, pulleys sheaves, pinions shafts, couplings and tubes are treated in Power-Twin Bulletin HY-1953, 24 pp. Covers use and application of pullers, attachments and adaptors for 17½-, 30- and 50-ton hydraulic rams. Also shows puller sets for use with company's center-hole rams. Owatonna Tool Co.

304 **Machine Tools, Their Lubrication**—A history of machine tools, and explanation of their mechanical aspects and an analysis of the role of lubricants in their maintenance and operation are contained in this 80-pp booklet. Not a manual on tool lubrication, this book is a comprehensive discussion of fundamental factors in the construction, operation and maintenance of modern machine tools. Shows how power is controlled and force directed to shape metal by cutting and chipping; analyzes factors that contribute to friction and wear; and describes role of lubricants. Shell Oil Co.

305 **Ram Type Turret Lathes** — Catalog 101-A, 28 pp, explains and illustrates how this company's ram-type universal turret lathe is designed to provide more power transmission, more time saving, more width where it counts, more ease of operation, more accurate stops and other advantages. Large colored illustration shows construction features of the lathe. Bar and chucking equipment are pictured. General specifications for five models are included. Jones & Lamson Machine Co.

306 **Improved Cutting Oils**—Cutting oils for keeping parts and tools up to 50 deg cooler and representing a new concept in non-emulsifying oils are described in two new technical bulletins. Form A-2724 describes Sunicut 11-S and 209-S, non-staining dual-purpose oils primarily for medium duty to heavy duty operation on automatic screw machines. Form A-2723 covers Sunicut 102-S and 110-S, which contain active-type sulfur and are effective for heavy-duty operations. Sun Oil Co.

307 **Data for the Shop**—"Fluids and Facts For Metal Working," is a pocket-size booklet of about 44 pp. A section on metal working fluids covers their function and selection, preparation and use of soluble oils and paste compounds, and prevention of dermatitis. A section on metal working facts gives conversion tables, steel numbering systems, machinability ratings of metals, drill grinding charts, twist drill sizes and other data. Booklet also includes product data on industrial oils, machine tool lubricants, greases, quenching and tempering oils. Standard Oil Co. (Ind.).

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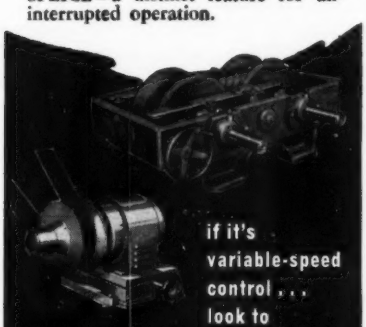

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(Begins on page 162)

WATER TREATING

308 Condensate Line Corrosion—Attributing condensate line corrosion chiefly to carbon dioxide in the steam and water. Technical Paper 127 discusses various methods of minimizing boiler feedwater alkalinity, especially the use of filming amines. Reports field results under various conditions. W. H. & L. D. Betz.

309 Shutdown Safeguards—"Laying Up Equipment" is a 6-pp folder devoted to the problem of safeguarding steam boilers, turbines and other water using equipment when "laid up" during shutdowns. Cites examples and suggests various methods used for protecting such equipment. Hall Laboratories, Inc.

LIGHTING, COMMUNICATION

310 Selection Data on Lighting Fixture Hangers—Catalog 50, 80 pp, contains general and detailed information on disconnecting and lowering lighting fixture hangers, accessories, special devices and parts. Utilizes 247 photos and drawings to show construction principles, operating features, installations, modifications and component parts for both indoor and outdoor units. The Thompson Electric Co.

311 How to Use Sound Signals—This new 44-pp combination manual, data book and catalog is an excellent reference work on industrial sound signals. Includes a simplified explanation of fundamentals of sound; a glossary of sound and signal terminology; a quick-comparison guide for selecting equipment; suggested steps in choosing a signal installation, and hints for compiling a code signal call system. Benjamin Electric Mfg. Co.

BOILERS, GENERATORS

312 Oil or Gas Fired Automatic Boilers—Boiler, burner, controls and safety features of 10 to 500 hp oil or gas fired automatic boilers are described in this 4-pp bulletin. Firing rates, dimensions and capacities are given for all models. Boiler Engineering & Supply Co., Inc.

313 Packaged Boilers—This 16-pp illustrated catalog describes manufacturer's new Type VP package boiler. Following a section of background information is an outline of principal design features of these boilers, which are shop assembled and provide steam capacities from 4000 to 30,000 lb per hour. Space requirements are shown in a table along with specifications. Combustion Engineering, Inc.

314 Steam Generators—"Cyclonic combustion," a new method of heat transfer is discussed in this bulletin. Descriptive drawings show how air is introduced into combustion chamber at high speeds in revolving spiral vortex, radiating heat to fire tube through direct radiation and convection. Cyclotherm.

315 Automatic Boilers for Oil, Gas—Bulletin 1230, 8 pp, discusses manufacturer's new line of simplified Powermaster packaged automatic boilers, including oil, gas burning, and combination units, in nine sizes from 15 hp through 100 hp, thus covering steam requirements to about 3450 lb/hr, also hot water designs. Gives details of design and construction, sample specifications. Orr & Sembower, Inc.

316 Shop-Assembled Boiler—Sixteen-pp, Bulletin G-76, completely describes and illustrates company's Type FM water-tube integral-furnace boiler, made in standard sizes from 2900 to 28,000 lb of steam per hr, pressure to 250 psi. Capacities, dimensions given. The Babcock & Wilcox Co.

LUBRICANTS, LUBRICATION

317 Proper Lubrication—Presenting proper lubrication as the life blood of all machinery, 36-pp Lubriplate Data Book 54-1 is a helpful treatise on modern lubrication practice. Gives product data on both oil type lubricants and greases and discusses choice of lubricants for use in applications involving heavy loads, high speeds, extreme temperatures, water conditions

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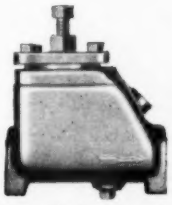

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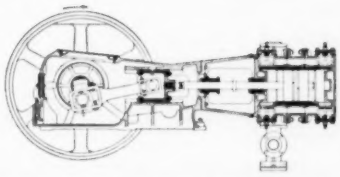

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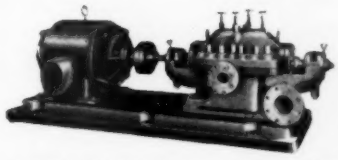

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DATA FILE

(Begins on page 162)

and other metal working. Provides tables of specific recommendations for various classes of equipment used in chemical processing, metalworking, other industries. Lubriplate Div., Fiske Brothers Refining Co.

318 Lubrication of Chain Drives—Vol. 39, No. 8 of Lubrication offers a 10-pp discussion on chain drives and their lubrication. Covers types of chains, conditions affecting their lubrication, choice of lubricants. Includes table showing lubricant recommendations for chain drives. Generously illustrated with photos and sketches showing chain arrangements, methods of lubrication. The Texas Co.

HEATERS, HEATING

319 Forced Air Space Heaters—Illustrated Bulletin 523-B, 12 pp, is devoted to a line of forced air heaters for comfort heating, yearround ventilating, tempering make-up air, process drying and heat curing. Explains design efficiency, construction details, operating principles and flexibility of application. Advantages of the heater are detailed. Dravo Corp.

320 Buying a Portable Heater?—Stressing safety factors involved, this 40-pp booklet, "Guide to the Selection and Use of Portable Space Heaters," analyzes temporary heating equipment from standpoints of personnel wellbeing, property protection and fire and accident prevention. Classifies basic types of direct, indirect-fired heating devices. Herman Nelson Div., American Air Filter Co., Inc.

321 Engineering Data for Heating Systems—A great deal of helpful information on heating systems is presented in Engineering Data Manual 2695, 28 pp. Detailed illustrated information pertaining to heating problems is given. Besides covering heating terminology, there are sections on steam data, water properties, piping data, weights and measures and pipe dimensions. C. A. Dunham Co.

322 Hot Water Storage Heaters—Catalog 18, 48 pp, illustrated in color, describes company's line of hot-water storage heaters, presents information on piping arrangements, installation data. Catalogs horizontal and vertical heaters as to weights, dimensions, construction, capacities—with conversion tables. Includes piping diagrams for high and low pressure steam systems, step-by-step guide for setting up and connecting a storage heater. Gives average water requirements of typical hot water fixtures in various types of buildings. The Patterson-Kelly Co., Inc.

323 Plumbing, Heating Supplies—Edition G is the current edition of this company's 118-pp general catalog on plumbing and heating repair parts, tools and accessories. Indexed and generously illustrated, gives sizes, intended uses. J. A. Sexauer Mfg. Co., Inc.

DUST CONTROL

324 Manual of Exhaust Hood Design—Bulletin 270-E1, 24 pp, features engineering data on dust control systems for the metal working industries. Illustrates and discusses the design of exhaust hoods for many operations in this field. Also, 61 photos of dust control installations show various methods of hooding dust sources. American Air Filter Co., Inc.

325 Dust Control—Engineered Efficiency in Dust Collection and Recovery," 36 pp, discusses industrial dust recovery from standpoint of nuisance alatement, waste avoidance, hazard elimination. Shows effect of variation in particle size, distribution and specific gravity of dust on efficiency of the dust collecting system. Buell Engineering Co., Inc.

326 Dust Collectors—Operation, construction, versatility and maintenance of company's unit dust collectors are explained in this bulletin. Includes capacities, sizes. The Kirk & Blum Mfg. Co.

327 Dust and Fume Eliminators—Catalog 482, 12 pp, describes company's Centri-Merge

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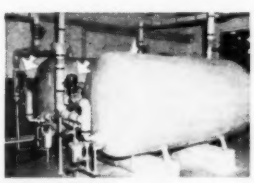

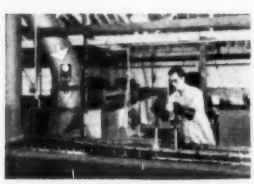

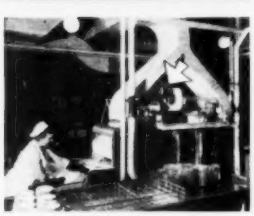

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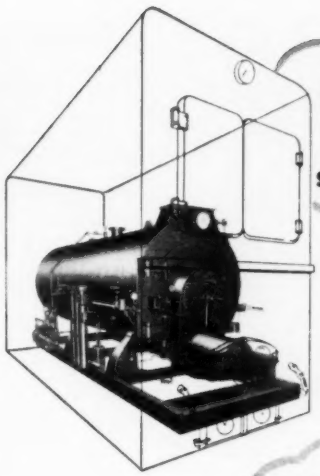

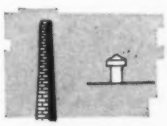

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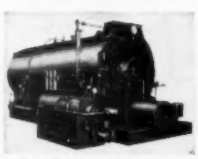

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(Begins on page 162)

dust and fume eliminators, explaining advantages of the swirl action incorporated. Illustrations and dimensional drawings of units with capacities ranging from 400 cfm up to 5000 to 30,000 cfm. Schmieg Industries, Inc.

MAGNETIC EQUIPMENT

328 **Magnetic Selection Guide**—Twelve-pp illustrated Catalog of C-5000-B, describing manufacturer's entire line of magnetic separators and lighting magnets, serves as handy guide to the selection of magnets. Dings Magnetic Separator Co.

329 **Magnetic Pipeline Traps**—Bulletin B-203 describes magnetic pipeline traps for sanitary and standard applications. These permanent (non-electric) traps are designed to remove tramp iron from liquid flow lines and afford protection to processing equipment. Typical trap installation data given. Eriez Mfg. Co.

TUBING, HOSE

330 **Metal Hose Manual**—Technical Data Book U-111, 24 pp, includes information on application, temperature ranges of various types of metal and wire braided hose, dimensions, couplings, assemblies. Types of hose manufactured by this company are illustrated and described, including seamless all-metal flexible pressure hose; interlocked suction, blower and conveyor hose; square locked conduits and flexible spout tubing; double wire-braided hose for high pressure. Universal Metal Hose Co.

331 **Hose and Tubing**—Catalog CC-400 is a 16-pp illustrated quick-reference booklet on manufacturer's flexible metal hose and tubing. These products are made in two basic types: seamless and strip wound. Catalog shows wide range of available alloys and sizes, suggested uses; gives engineering data. The American Brass Co.

332 **Tubing for Many Jobs**—Flexible tubing for ventilation, fume and dust removal as well as materials handling is described in 8-pp Catalog C2-4. Gives detailed information on company's Spiratube A and Spiratube R, two types of lightweight tubing made from continuous helical coils of spring wire wound with overlapping plies of fabric. Gives applications. Flexible Tubing Corp.

VIBRATION CONTROL

333 **Improved Machine Mounts**—This brochure describes advantages of company's leveling machine mounts. Tells how they enable installation and leveling of heavy machines without bolting or shims, afford increased plant mobility, reduce maintenance costs, and lessen noise. Barry Corp.

334 **Engineered Vibration Control**—Bulletin 104 presents spring, cork and rubber mountings, discusses advantages of each and use alone or in combinations. Provides helpful selection chart covering a wide range of machines, showing recommended and alternate methods of isolation. The Korfund Co.

INSULATION

335 **Pipe Insulation**—Bulletin F 1-100 features on-the-job installation photographs of cellular glass insulation for pipe temperatures between —300 and 800 F. Complete listing of physical properties, condensed specifications are given. Pittsburgh Corning Corp.

336 **Flexible Duct Insulation**—Form F-180 describes and gives product specifications for fiber glass flexible duct insulation. Advantages are cited, and easy installation procedure is illustrated. Also included are data on thermal insulating and acoustical insulating qualities. Fiber Glass Div., Pittsburgh Plate Glass Co.

337 **Improved Heat Insulation**—This 8-pp bulletin describes Super-Light 85% Magnesia for temperatures to 600 F, available in cement

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*We will be glad to send you a copy of the Handbook of Crushing. This book contains data on mechanical size reduction that is not available anywhere else. Pennsylvania Crusher Company (division of Bath Iron Works, Inc.) Room 1763, West Chester, Penna.

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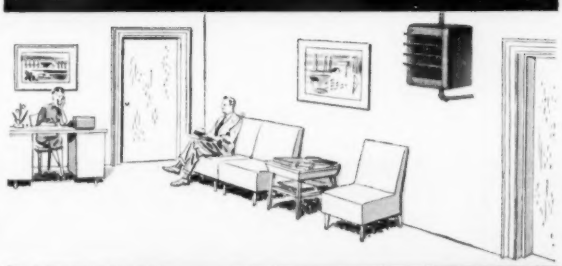

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OWATONNA TOOL COMPANY
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DATA FILE

(Begins on page 162)

blocks, pipe sections. Twelve advantages of this lightweight insulation are detailed. Recommended thickness, physical characteristics, prices are given. Also included is information on combination coverings with Tempchek inner layer for temperatures from 550 to 1500 F. The Philip Carey Mfg. Co.

OTHER EQUIPMENT

338 Industrial Ovens — Thirteen types of company's Convectioneered ovens, which apply principles of forced convection heating to various industrial processes, are illustrated and described in 12-pp Bulletin 200. These ovens serve foundries, metal finishers, plastics producers. The W. W. Sly Mfg. Co.

339 To Keep Wire Rope at Work—Form 3547 is an 82-pp handbook titled: "Here's How to Keep Your Wire Rope Working," and filled with practical tips on care and use of wire rope. Tells how wire rope is constructed, what types are suited to various jobs, how to install it. Covers such subjects as abrasion, lubrication, avoiding kinks, alignment of sheaves, winding on drums, bending fatigue, wire breaks, when to discard a wire rope. Wire Rope Div., American Chain & Cable Co., Inc.

340 Industrial Equipment — Bulletin WP-1099-B61, 16 pp, describes manufacturer's industrial equipment including centrifugal refrigeration systems, condensers and coolers, steam power plant equipment, water conditioning deaerators and rotary pumps. Gives features, types, sizes, capacities, and describes their application. Worthington Corp.

341 Neoprene Design Book—This illustrated bulletin discusses the properties of Neoprene, showing how they are utilized in products made from this chemical rubber. Covers its toughness, hardness range, air retention, performance under load, at extreme temperatures, flame and chemical resistance. Rubber Chemicals Div., E. I. du Pont de Nemours & Co.

342 ABC's of Dryness—Eight-pp Bulletin 16.0.081 presents packaged dehydration units for efficient drying of air or other gases. Tells what these dryers can do, what they will remove dryness from and where they are recommended for use. Explains drying operation; discusses absorbents and equipment utilized, giving construction details and sizes offered. Typical arrangements for both full-stream and split-stream reactivation are diagrammed, and selection information included. Equipment Div., J. F. Pritchard & Co.

343 Industrial Ventilation Guide—Bulletin 1520, 28 pp, presents ventilating problems peculiar to industry and shows some of the ways in which company's equipment is solving those problems. They cover general ventilation, heat and steam exhaust, smoke and fume exhaust, air circulation, equipment cooling, dust removal, air filtering, heating. Includes data on air change requirements, information on fan selection, and location use of ducts with propeller fans. Ilg Electric Ventilating Co.

344 Handbook on Fluids Circuits—Now available to plant engineers is the second printing of "The Circuit Rider." This 32-pp pocket-size manual presents a down-to-earth discussion, together with drawings, of basic designs in fluid power circuits and points out the wide range of operations possible through the application of different types of such circuits. The Logansport Machine Co., Inc.

345 Air Conditioning Cabinets—Engineering Bulletin 3703A. 40 pp describes and illustrates manufacturer's Model G cabinets, central units available in both horizontal and vertical models, providing 875 to 22,000 cfm and offering combinations for any function or functions of air conditioning. Booklet gives construction details, discusses heating and cooling coils. Buffalo Forge Co.

346 Industrial Non-Metallics—Polypenco Nylon, Teflon, filled nylons, and other nonmetallics are the subject of this bulletin. Illustrated with photos, gives characteristics and advantages of these materials, data on rod, strip, tubing and slab available, parts that can be produced. Polymer Corp. of Pennsylvania.

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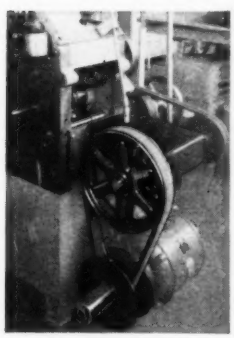

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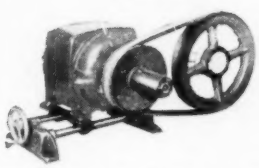

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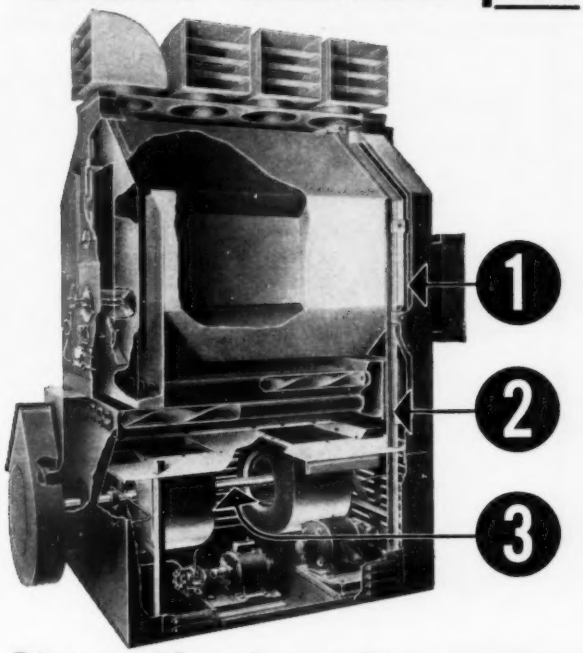

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DATA FILE

(Begins on page 162)

348 **Industrial Leathers**—These illustrated data sheets cover company's leather products and include specifications on various types of leather belting. Also gives data on leather packings for hydraulic and pneumatic equipment. J. E. Rhoads & Sons.

349 **To Keep Out Moisture**—Vents designed for easy installation on any roof to keep out wet, foul air are described in this literature. Muckle Manufacturing Co.

350 **Self-Lubricating Bushings**—Eight-pp Bulletin Form 112 discusses company's Graphalloy bushings, designed for strength and high heat dissipating qualities. Also discusses such advantages as durability, no fumes, low and high temperature operation, fire preventive and low coefficient of expansion. Presents engineering data, grades of Graphalloy, physical characteristics. Graphite Metallizing Corp.

351 **Precision Blending System**—This 12-pp folder describes the construction operation, flexibility and wide application of a system for accurately blending, compounding or mixing two or more liquids in increments as low as 1/20 per cent. Stresses long-run economy of system. Illustrated in color. Bowser, Inc.

352 **Dry Chemical Extinguishers**—New quick-acting fire extinguishers of the dry chemical type in 20 and 30 lb sizes are covered in Form C-104. C-O-TWO Fire Equipment Co.

To order these catalogs circle item numbers on the handy Reader Service Cards provided on pages 157-158.

353 **Finishing Systems**—Illustrated Catalog A-653, 12 pp, describes complete finishing systems for porcelain and synthetic enamel, lacquer, paint, and other finishing. Also covers a variety of other industrial equipment including ovens, dust collectors and fog filters. The R. C. Mahon Co.

354 **Handbook on Crushing**—Not an ordering catalog, this 32-pp manual is aimed at a better understanding of mechanical crushing in order to promote better results from crushing operations. Well illustrated, booklet stresses importance of suiting the crusher to the job. Four means of mechanical reduction—impact, attrition, shear and pressure—are discussed. Also included is information on power requirements of crushing and selection factors. Pennsylvania Crusher Co.

355 **Oil Cooling Equipment**—Catalog F-B 1052, 20 pp, discusses controlled quench, oil cooling for uniform quality in heat-treated metals. Describes and illustrates typical installations of coolers; tells how to select cooling systems; and gives circulation rates. Charts show oil recirculation for batch quenching, determination of amounts of oil required. Illustrates accessories including Kleen-Well oil strainers, "Perambulators" oil coolers, junior quencher, pumps. Bell & Gossett Co.

356 **Hints on Babbitting Practice**—In outlining basic steps for the prevention of common bearing failures, Bulletin 146, a little 16-pp booklet, covers everything from the choice of metal for a particular bearing application through the correct pouring practice to in-service maintenance. Proper lubrication, a maintenace schedule, and operation at correct speed are discussed. Federated Metals Div., American Smelting and Refining Co.

357 **Steel Reservoirs, Standpipes**—This 24-pp booklet pictures installations of reservoirs of 50,000- to 10,000,000-gal capacity, having cone, umbrella or ellipsoidal roofs and ornamental structures with special architectural features. Provides table of standard capacities, information on foundations, use of suction tanks for fire protection. Chicago Bridge & Iron Co.

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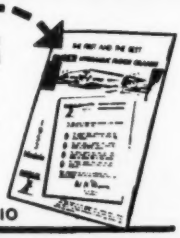

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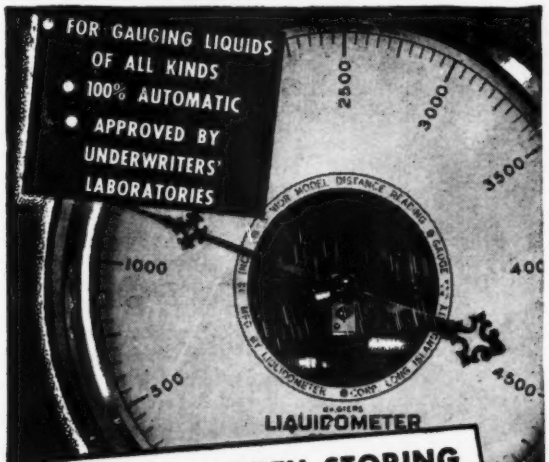

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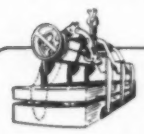

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NEW BOOKS

for the plant engineer

Engineering and Shop Data

MACHINERY'S HANDBOOK. Size 4¾ by 7¼ in.; 1911 pp; 15th edition; illustrated; cloth bound. Published by The Industrial Press, 148 Lafayette St., New York 13, N. Y. Price $9.00.

ADDITIONS and changes to this new edition of the widely popular publication make it even more valuable than before. Along with its tabulated information, the book contains quite a bit of text material pertaining to machining and engineering.

The familiar notched page arrangement of its predecessors is retained which makes it easy to open the handbook to a section of specific interest.

New material appears on generated bevel gears, fine pitch worms and wormgears, and ball, roller and needle bearings. The milling cutter portion, this edition, includes tables on tolerances and dimensions of different American Standard milling tools.

Among the thirteen main divisions of the handbook are the following: Limits, gages; Small tools; Speeds, feeds; Steel alloys; Motors.

Earnings in Engineering

PROFESSIONAL INCOME OF ENGINEERS. Size 6 by 9 in.; 31 pp; paper bound. Published by Engineers Joint Council, 29 West 39th St., New York 18, N. Y. Price $2.00; to members of constituent societies, $1.00.

FINAL REPORT of a survey conducted in 1953 by the Engineers Joint Council Special Surveys Committee contains information covering professional income of about 72,000 engineers in industry, government, and in the teaching profession.

Basic data offered relates to the year when a degree was received after formal engineering training. Incomes in different types of employment are plotted, in graph form, versus year of baccalaureate degree.

Non-Destructive Testing

SYMPOSIUM ON NON-DESTRUCTIVE TESTING. Size 6 by 9 in.; 103 pp; illustrated; 1953 printing; paper bound. Published by American Society for Testing Materials, 1916 Race St., Philadelphia, Pa. Price $2.00.

PAPERS PRESENTED at the 50th anniversary meeting of ASTM in 1952 appear in this symposium which was sponsored by a society committee under the co-chairmanship of J. Smack

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#5 Ware Room, Tin Plate Mill, Jones & Laughlin Steel Corporation, Aliquippa, Pa.
Aluminum Paint: James B. Sipe & Company

ALUMINUM PAINT IMPROVES INVENTORY CONTROL IN THIS J&L WARE ROOM

Lighting efficiency is an important factor in this J&L Tin Plate Ware Room where inventory is taken each day. According to Clair Figley, J&L Tin Plate Warehouse Foreman, adequate lighting between the high rows of cartons was always a problem. That is, until the roof and supporting structures were painted with highly reflective aluminum paint.

Because of the extra brightness provided by aluminum paint, markings on all cartons are now clearly visible, even in the aisles where there are no lights directly overhead.

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of Sperry Products, Inc., and D. T. O'Connor, U. S. Dept of Navy.

Information in this publication pertains mainly to the testing of metal in such forms as sheets, rods, castings, forgings, and machined assemblies. Plastics are also mentioned in the booklet.

In this collection of papers, attention is given to such subjects as weld radiography, ultrasonic testing methods and electronic sorting of metals.

Mechanical Motion

ELEMENTS OF MECHANISM by Venton Levy Doughtie and Walter H. James. Size 5¾ by 8¾ in.; illustrated; 494 pp including index; cloth bound. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Price $6.00.

THIS WORK is based on a book which was first written quite a number of years ago. It was authored by Peter Schwamb. Allyn L. Merrill and Walter H. James took part in the authorship of later editions. All three were professors at the Massachusetts Institute of Technology.

The present book has been rewritten by Venton Levy Doughtie of the University of Texas. He has given consideration in his changes to new developments; terminologies have been altered to fit the present day usage.

One of the aims of the book is to develop in the reader a sense of analysis which can be used to handle complex mechanical arrangements. It also brings to his attention applications of physics and mathematics to problems involving mechanical movement.

Velocity analysis, linkages, cams, gears, belts, ropes and chains, and power transmission trains are some of the subjects that are considered.

There is a number of problems given at the end of each section. Drawings required in solutions of problems can be handled on 8½ by 11 in. paper.

Chrome-Moly Steels

REPORT ON THE ELEVATED-TEMPERATURE Properties of Chromium-Molybdenum Steels. Size 11 by 8½ in.; 208 pp; paper bound; 1953 edition. Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. Price $4.75.

HERE IS one of a series of reports under the auspices of the data and publications ASTM-ASME Joint Committee on effect of temperature on the properties of metals. It presents summary curves for tensile strength; 0.2 per cent offset yield strength; per cent elongation and reduction of area; stresses for rupture in 100, 1000, 10,000 and 100,000 hours and others.

Appendix includes data used in the preparation of the summary curves; data sheets are very useful as references in the study of curves. Information pertaining to chemical composition, processing and heat treatment and other information on steels covered by this survey is given in the data sheets in the report.

More on Air Conditioning

HEATING-VENTILATING-AIR CONDITIONING GUIDE 1954. Vol. 32. 1616 pages, size 9¼ by 6 in., cloth binding. Published annually by The American Society of Heating and Ventilating Engineers, 62 Worth St., New York 13, N. Y. Price $10.00.

NEW FEATURES OF the 32nd Edition of this excellent reference book include a chapter on residential summer air conditioning, new data on methods of obtaining local relief in hot humid environments, recent developments in industrial air and gas cleaning, and many other changes made necessary by recent developments in the field. Wherever possible, previous text has been condensed, and the space saved has been used for additional new material and improvements.

Here are a few examples of some of the important changes to be found in this new edition:

Chapter 11—Infiltration and Ventilation: The section on Garage Ventilation was enlarged and improved.

Chapter 31—Air Distribution: This chapter was rewritten and enlarged by the Technical Advisory Committee on Air Distribution in consideration of recent air flow research.

The references and bibliography were revised to give a list of the most significant articles and readily accessible papers, particularly those to be found in ASHVE publications.

Chapter 39—Automatic Control: The chapter was enlarged to bring it up to

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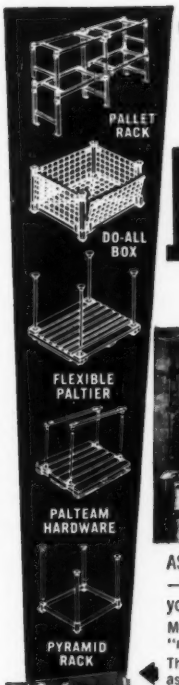

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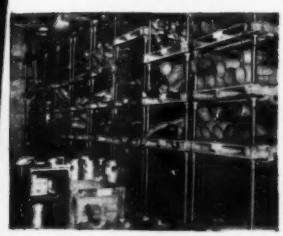

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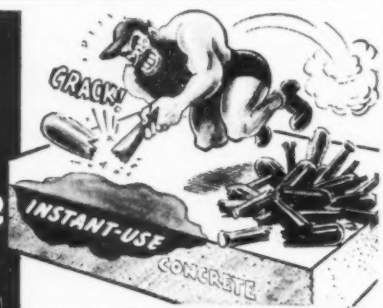

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date with recent progress. Several types of control not previously shown were included. A new section on coordination of controls was added.

Chapter 42—Electric Heating: New material was added describing types and features of various systems, including panel.

A 24-page comprehensive subject index of the Technical Data Section follows the Table of Contents. A Catalog Data Section showing products of 319 well-known manufacturers is included, together with a detailed index for rapid reference to any type of equipment.

Human Relations and Cost Reduction

MANUFACTURING SERIES. Published by American Management Association, 330 West 42nd St., New York 36, N. Y. Price $1.25 (non-members), $1.00 (members).

ADJUSTING TO A COMPETITIVE ECONOMY—THE HUMAN PROBLEM, No. 214, 48 pp. The author in the first paper of this publication considers human relations in a "hard sell" period and points out what can be done to improve employer-employee relations and help the employees get a better understanding of their status in the industrial picture.

This is followed by another paper devoted to the way Bausch and Lomb Optical Co. reviewed the incentive system in its plant for the purpose of improving it.

STRATEGIC AREAS IN COST REDUCTION, No. 215, 28 pp. One of the papers in this collection treats the increase of efficiency in preventive maintenance. It covers the selling of the idea to management and gives attention to forms in a preventive maintenance program.

Other papers included in this publication are as follows: Purchasing for profit; slicing waste effort from materials handling; and top management views cost cutting controls.

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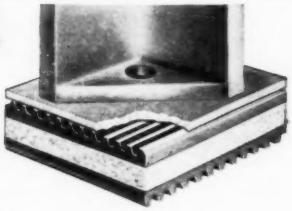

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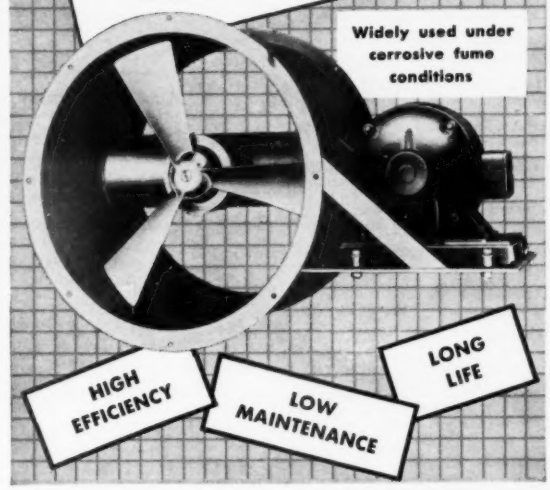

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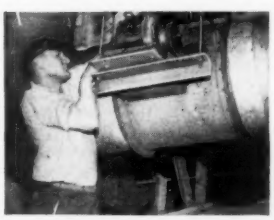

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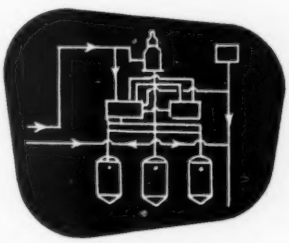
CHECK RESISTANCE TO CORROSIVE MEDIA

How well a coating withstands the action of a given corrosive agent is the first factor you must necessarily consider in choosing the right coating for your needs — but it's *only* the first.



CHECK ADAPTABILITY TO SERVICE CONDITIONS

The second factor — and one you can't always predetermine by laboratory test — is on-the-job performance. That's governed, in turn, by the kind of metal you're protecting . . . the condition of the surfaces . . . how the equipment is constructed . . . conditions encountered during its operating cycle . . . during idle periods — considerations that must be surveyed in detail before you can select a protective coating with reasonable assurance it will successfully meet your requirements.

Dampney equipment-engineered coatings give you that assurance because they are formulated to do certain selective, specialized jobs both large and small, difficult and routine — to give you the protection that is right for you — not in a costly, custom-made material nor an all-purpose anti-corrosive, but in a coating *engineered for the equipment it is to protect.*

Dampney's industrial equipment knowledge is yours to call upon freely. Let us put it to work on your next coating problem.

MAINTENANCE FOR METAL

THE DAMPNEY COMPANY

BOSTON 36, MASSACHUSETTS

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Dual-Element Cartridge FUSES

Now, Even More:

FOR FUSE ECONOMY ...use ECONOMY Fuses!

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These recently announced Cartridge Fuses offer greater protection against wasteful overloads and "shorts", and their resulting, needless shutdowns and production delays.

In addition to this dependable motor and branch line protection, Econ Dual-Element Fuses also guard against high temperature and its costly effects, in the fuse boxes and the connections associated with the fuse clips switches.

Econ Dual-Element Cartridge Fuses are available in knife and ferrule types; 0 to 600 amperes; 250 and 600 Volts. Underwriters' Laboratories, Inc. Approved. Carried in stock by leading Electrical Wholesalers. Write for New ECON Catalog S-60 or for literature on other type fuses in which you are interested.

☆ ☆ ☆

Your Electrical Wholesaler has ECON Dual-Element Cartridge Fuses in stock

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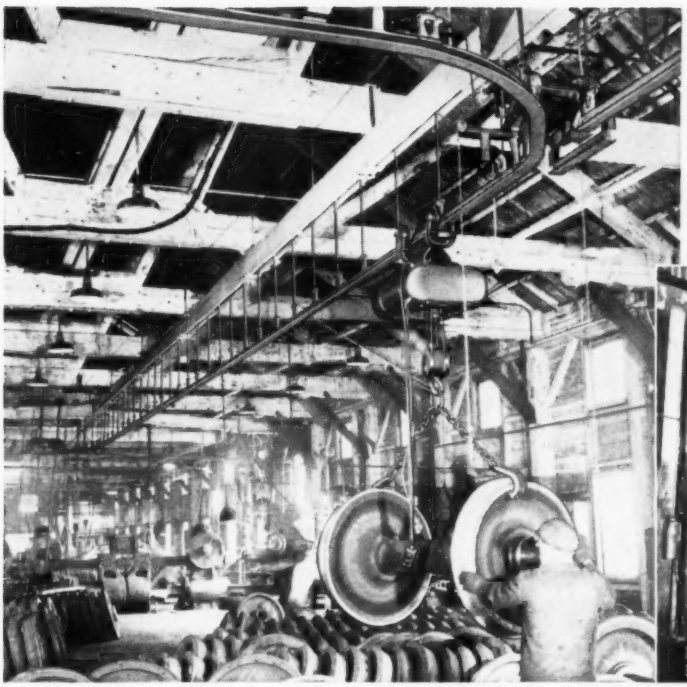
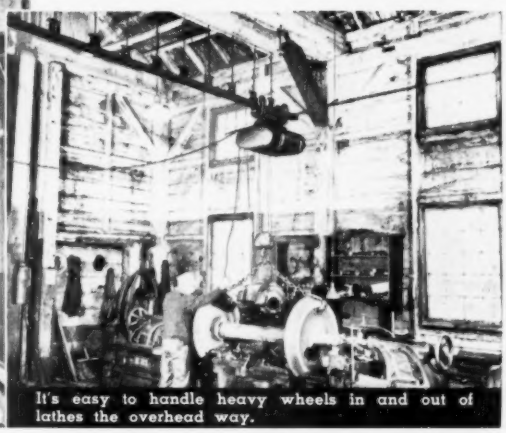
railroad CUTS WHEEL SHOP HANDLING COSTS



It is a simple job for one man to move wheels from one part of the shop to another with the Tramrail system. Floor obstacles cause little or no interference.

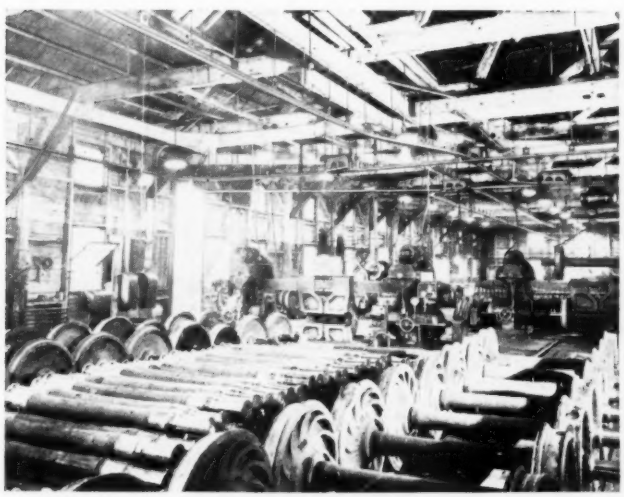


It's easy to handle heavy wheels in and out of lathes the overhead way.

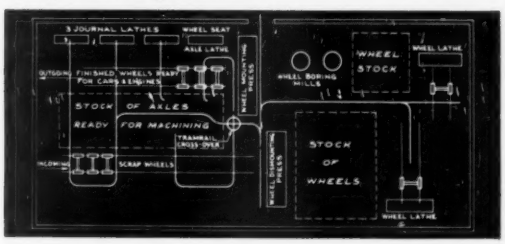
Since 1938 a simple Cleveland Tramrail No. 2100 rail system has served the wheel shop of the Delaware and Hudson Railroad, Oneonta, New York.

It has proven very valuable because it speeds production and cuts handling costs. Rush jobs can be put through quickly. Tramrail equipment makes it easy to deliver car wheels from one part of the shop to another, whereas formerly it was a big job to roll them or truck them through.

The equipment is 3 tons capacity and hand propelled with hoists electrified. Despite being supported by wooden beams, it is a simple matter to keep the track level by the easy hanger rod adjustment.



All sections of the Wheel Shop are served by the overhead track system.



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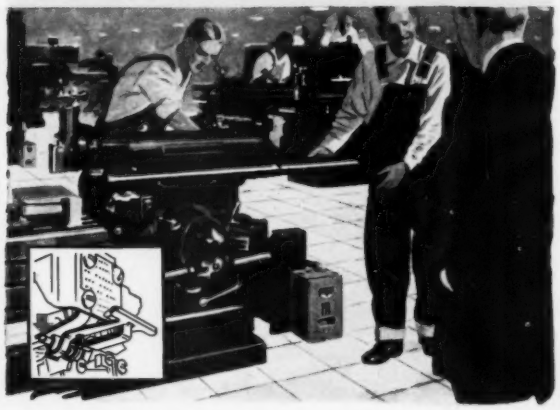
THE THREE CUTLER-HAMMER STARS
★ ★ ★
STAND FOR THREE NEW STANDARDS

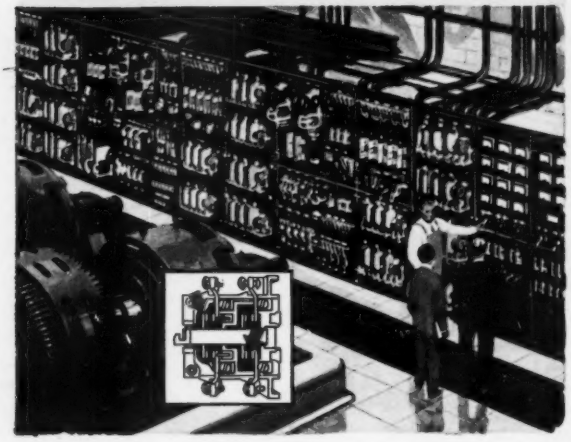
Rolling bearing action...

The proper performance and useful life of *all* modern machines demand anti-friction bearings. Motor control is no exception; it too must have good bearings to avoid wear and trouble.



Dust-safe vertical contacts...

Experienced engineers *know* vertical contacts work better and last longer because they stay clean, shed dust, do not collect it. Pressure arc quenching is important new C-H feature.

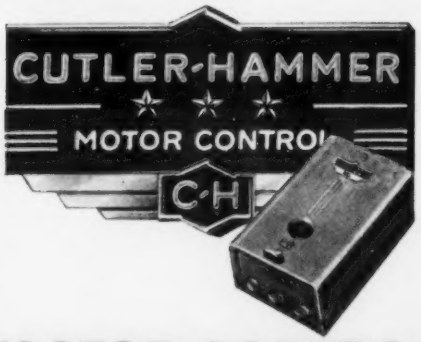


☆ *installs easier*
☆ *works better*
☆ *lasts longer*

Less bounce by the ounce...

Research showed contact bounce caused arcing, that reduced weight in moving contact members cut bounce and arcing. So new light-weight parts now remarkably lengthen contact life.

Cutler-Hammer Motor Control has always been respected for its long life. It has frequently been chosen for industry's "killer" jobs by comparative test. Many users say, "I have never seen a Cutler-Hammer starter wear out!" Yet the new Cutler-Hammer ☆☆☆ Motor Control has *three times* the life of the good equipment it replaces! Nearly unbelievable, but it IS true. Now motor control you can install and forget! Try it. Prove it. Your nearby Cutler-Hammer Authorized Distributor is ready to serve you. Order from him today. CUTLER-HAMMER, Inc., 1447 St. Paul Ave., Milwaukee 1, Wisconsin.



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SEPTEMBER, 1954

Plant Engineering

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The magazine that helps plant engineers with their everyday problems